

FLORIDA WILDLIFE®

Volume 43, Number 2

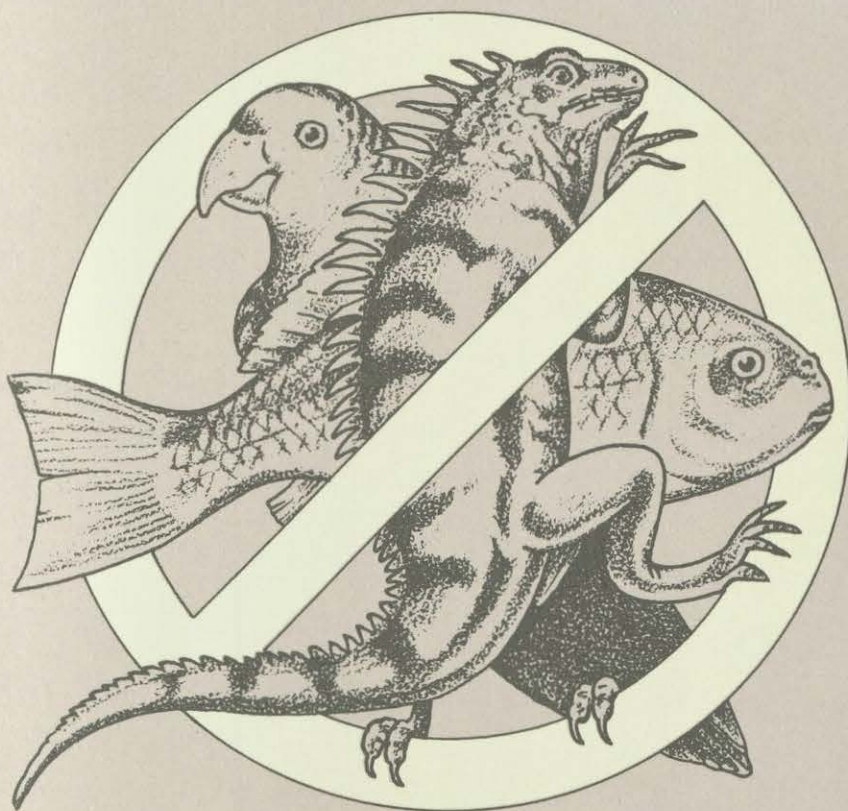
March-April, 1989



Peggy Erkersen '89 ©

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Florida law prohibits the release of any non-native wildlife (*Florida Statutes 372.265*) because these exotics may be harmful to humans, become serious agricultural pests or compete with our native wildlife species for food and habitat.



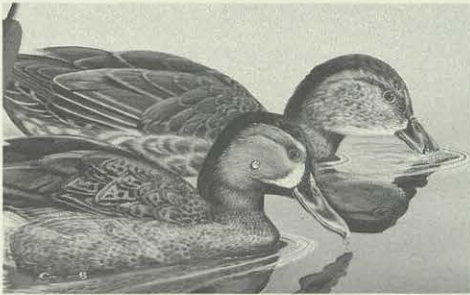
DON'T RELEASE EXOTICS

Before releasing any animals, contact your Florida Game and Fresh Water Fish Commission.

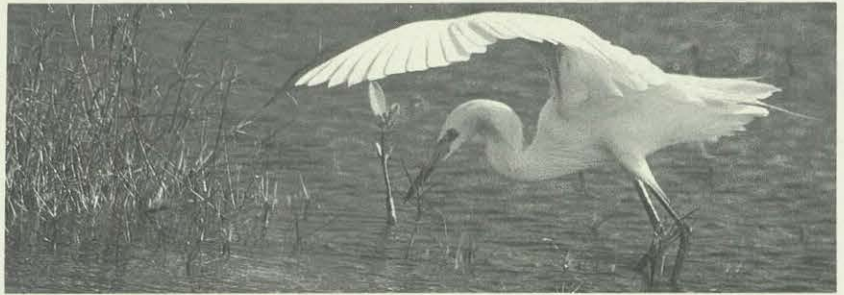
FLORIDA WILDLIFE®

Volume 43, Number 2

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Publisher

Andrea H. Blount
Editor

Peggy Perkerson
Art Editor

Mary Tebo
Assistant Editor

Mary Beth Savage
Circulation Manager

Sharon Marshall
Electronic Typesetting

William A. Greer
Contributing Photographer

Steven O. Lewis
Laverne Roberts
Circulation Assistants

Rose Printing Company Inc.
Commercial Printing

Florida Color Graphics Inc.
Color Separations

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Member

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OUR COVERS

This issue's cover features a subtle watercolor painting of red wolves by Peggy Perkerson, art editor of *FLORIDA WILDLIFE*. The Floridana column (inside back cover) was written by Phillip M. Pollock.



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DRUGS and LIONS

Wildlife Inspectors Assist With Drug Bust Near Naples

By Lt. Jim Huffstodt, Everglades Region

The date was October 24, 1988. In the back bedroom, a suspected drug smuggler slept late. His loaded MAC-10 machine gun lay within easy reach while two pet adult mountain lions padded about the room—further discouragement to uninvited guests.

His semi-rural Golden Gates Estates home, located approximately 10 miles east of Naples, stood in the center of a compound barricaded by an eight-foot fence topped with electrified barbed wire. The fence protected the treasures of a flamboyant and affluent lifestyle: a luxurious motor home, a 26-foot cabin cruiser, an Electro-Glide motorcycle, a classic 1950s Ford convertible hardtop, a Piper Cub aircraft, three all-terrain cycles, and four caged mountain lions.

U.S. Customs agents had been investigating the man and his wife for some time. They believed the expensive playthings might have been purchased with profits from smuggling marijuana into Florida aboard fishing vessels. Evidence gathered during a two-year investigation indicated that the suspects might be part of a criminal enterprise that had attempted to smuggle 300,000 pounds of marijuana since 1986.

At 11 a.m., the suspect's wife was working in the yard when she noticed a familiar green Ram Charger roll up to the locked gate. The driver was Lieutenant John West, wildlife inspector with the Florida Game and Fresh Water Fish Commission. Another Commission vehicle pulled up behind him, also carrying uniformed wildlife officers.

West had visited the home several times conducting inspections to insure that the mountain lions were

being housed and treated in compliance with Florida's Wildlife Code.

West explained that the men with him were new reserve officers who wanted to see some big cats. The woman swung open the gate, and the five officers entered. She didn't know that two were really U.S. Customs agents wearing Commission jackets.

While West conducted his inspection of the cats in the outside cages, the others engaged in small talk and admired the big predators. The plot had gotten them past the gate, but the husband—assumed armed and dangerous—was still in the house.

That's when Lieutenant West mentioned a problem about the couple taking mountain lions on visits to their restaurant in nearby Goodland. "I really need to have your husband come out and discuss the problem with me," West told her. The woman expressed concern, and left to get her husband.

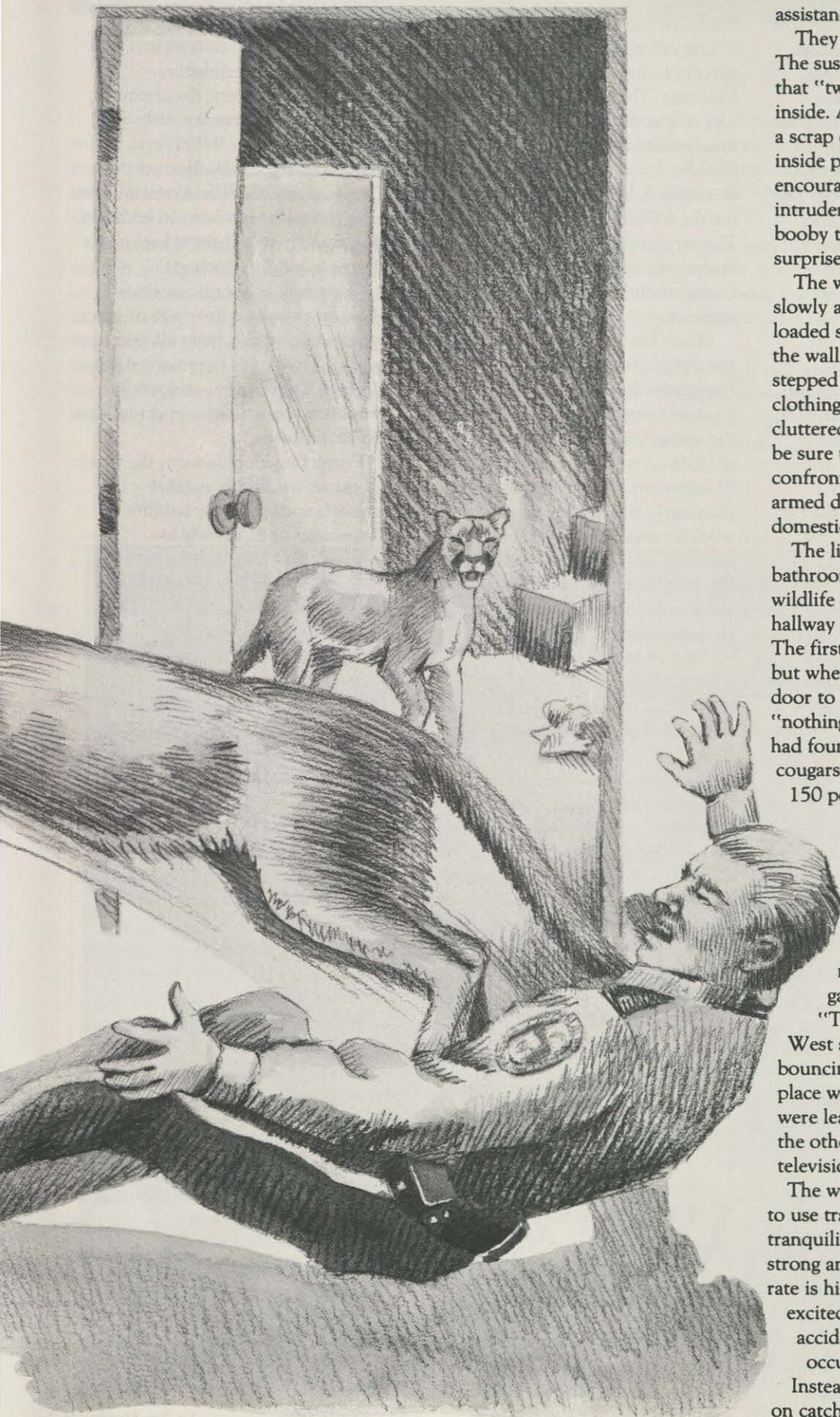
The woman appeared a few minutes later, followed not long afterward by the husband, who appeared sleepy and complained about the bright sunshine. Neither suspect was prepared when the disguised U. S. Customs agents quickly handcuffed them, frisked them, and read them their legal rights.

West breathed easier. The plan had worked out to perfection. Originally he, along with Lieutenant Tom Quinn and Sergeant Eddie Lee Henderson, had been along on the raid to assist with captive wildlife. However, when the suspect had failed to leave the compound on his regular morning trip for coffee and donuts, the recruited wildlife

officers played a much larger role.

With the suspects under arrest, the U.S. Customs agent in charge, Paul Kilcoyne, requested that the wildlife officers clear the home of any other potentially dangerous animals. West and Quinn were especially qualified for the challenge: they work with every conceivable kind of animal as wildlife inspectors.





Sergeant Henderson, a veteran wildlife officer, would provide assistance.

They weren't sure what to expect. The suspect's wife would only say that "two of her babies" were still inside. And the warning scrawled on a scrap of cardboard taped to the inside porch wall wasn't encouraging. The message promised intruders that they would encounter booby traps and other unpleasant surprises.

The wildlife officers moved slowly and carefully, noting the loaded shotgun that leaned against the wall inside the front door. They stepped gingerly over the debris, clothing and assorted junk that cluttered the home. They couldn't be sure that they wouldn't be confronted at any second by an armed drug suspect or a supposedly domesticated mountain lion.

The living room, kitchen, and bathroom were empty. Then the wildlife officers entered a long, dark hallway with three closed doors. The first two rooms were empty, but when Quinn cracked open the door to the back bedroom he saw "nothing but teeth and eyes." He had found the "babies"—adult cougars weighing 100 pounds and 150 pounds respectively.

U.S. Customs agents were searching the rest of the home for drugs, weapons, and evidence as Quinn and West entered the back bedroom. They moved slowly in an effort to gain the cats' confidence.

"They were highly agitated," West said. "Those cats were just bouncing all over that room. The place was piled with junk, and they were leaping from one corner to the other. One even landed on a television set at one point."

The wildlife officers decided not to use tranquilizer guns because the tranquilizing drug can have too strong an effect if an animal's heart rate is high. "Both cats were very excited," West said. "An

accidental overdose could easily occur in such a situation."

Instead, the wildlife officers relied on catch-poles. This device is a ▷

three-foot long metal tube with a cord running through the hollow center. The cord forms an adjustable noose on the end. The pole allows the user to immobilize an animal while keeping it at a safe distance.

Unfortunately, before either West or Quinn could capture one of the cats, another official searching the house opened the hallway door. The bigger 150-pound mountain lion, already feeling threatened, didn't hesitate to leave—even though Quinn was standing squarely in front of his escape route.

The big cat sailed into the air, hitting the 6-foot-2-inch, two-hundred pound officer squarely in the chest with the impact of an NFL football linebacker. Quinn was knocked flat. He realized the animal wasn't attacking him but only seeking escape. However, as the cat jumped off the prone officer, his hind claws slashed open Quinn's shirt. The officer escaped injury only because of his bullet-proof vest.

As the tawny animal bounded down the hallway, Quinn shouted to Customs agents: "Don't shoot the cat! Don't shoot the cat!"

They held their fire and cleared a path for the brown blur that headed out the front door and emerged into the compound. Seconds later Quinn followed, determined to capture the animal without causing it any injury.

West was left in the back bedroom with the other cat. Carefully avoiding the MAC-10 machine gun lying on the floor, he managed to get a noose around the animal's neck. The bedroom was designed so that sliding doors gave access to an outside cage. West guided the animal into the cage and secured the gate.

Outside, the other cat roamed around but never approached the surrounding fence. Quinn deduced the animal was aware, from past experience, that the top strands were electrified. Quinn managed to place his catch-pole noose over the big cat's head and led it back to the bedroom cage.

The next day, the six mountain lions were moved into transport cages for a trip to Frank Weed's

exotic wildlife center near Immokalee where they awaited the results of the trial.

The defendants face numerous narcotics charges filed by U.S. Customs. They were among 89 suspects arrested in a crackdown on drug trafficking in southwest Florida, according to Robert W. Genzman, United States Attorney for the Middle District of Florida. The arrests capped a two-year undercover operation by U.S. Customs and other law enforcement agencies.

Major Jim Ries, the Commission's law enforcement commander for the Everglades Region, said U.S. Customs expressed appreciation for the assistance the Commission wildlife officers provided.

"Lieutenant West's suggestion to disguise U.S. Customs agents as wildlife reservists may have avoided gunplay. And, our experience with handling mountain lions proved invaluable in these unusual circumstances," he said.

"We've found on several occasions that drug dealers in Florida are infatuated with large, exotic pets such as mountain lions," Ries said. "The motives vary from individual to individual, but they probably relate to the flashy, intimidating, macho image these people enjoy projecting. Our concern, of course, is to protect the public and simultaneously insure that innocent wild animals aren't abused or exploited by the criminal element."

Wildlife Inspectors: Law Enforcement Specialists

Wildlife inspectors specialize in protecting wildlife from exploitation. This mission can be as mundane as checking paperwork on a pet raccoon or as hazardous as capturing a poisonous spitting mamba snake loose in a Miami suburb.

The Florida Game and Fresh Water Fish Commission's nine wildlife inspectors regulate pet shops, individuals that own wildlife as pets, exhibitors, importers/exporters, taxidermists, rehabilitators, falconers, fish farmers, and zoos. Wildlife inspectors are graduates of the Commission Wildlife Academy and have full police powers. In addition, they must have at least a bachelor's degree in wildlife biology.

Their task is enormous since Florida is the hub for trade of exotic mammals and fish from all over the world. The state's commercial pet dealers, fish farmers, and wildlife exhibitors constitute a multi-million dollar industry.

Protecting Florida from the threat of exotic wildlife is another important duty of the wildlife inspection unit. Florida is particularly vulnerable to invasion by exotic animals and fish that are imported and released. The state's moderate climate provides favorable conditions for exotic species to survive and quickly proliferate. These foreign organisms then compete with native wildlife for food and resources, disrupting Florida ecosystems.

Wildlife inspectors have their share of routine duties but, as the Naples incident illustrates, their job often entails unusual challenges and risks. Recent adventures in south Florida have included rescuing a Bengal tiger, several American bison, and a saltwater crocodile.

"Our wildlife inspectors encounter just about everything under the sun," said Major Jim Ries of the Everglades Region. "It takes specialized knowledge and a special kind of person to do the job."

"Wildlife inspectors love wild animals and play an important role in protecting them," Ries continued. "Sometimes that means taking risks, both with animal predators and the more dangerous human predators who exploit and abuse—either deliberately or through negligence—some of the world's most beautiful animals." 

Lt. Jim Huffstodt

It's The Law

By Inspector Kyle Hill

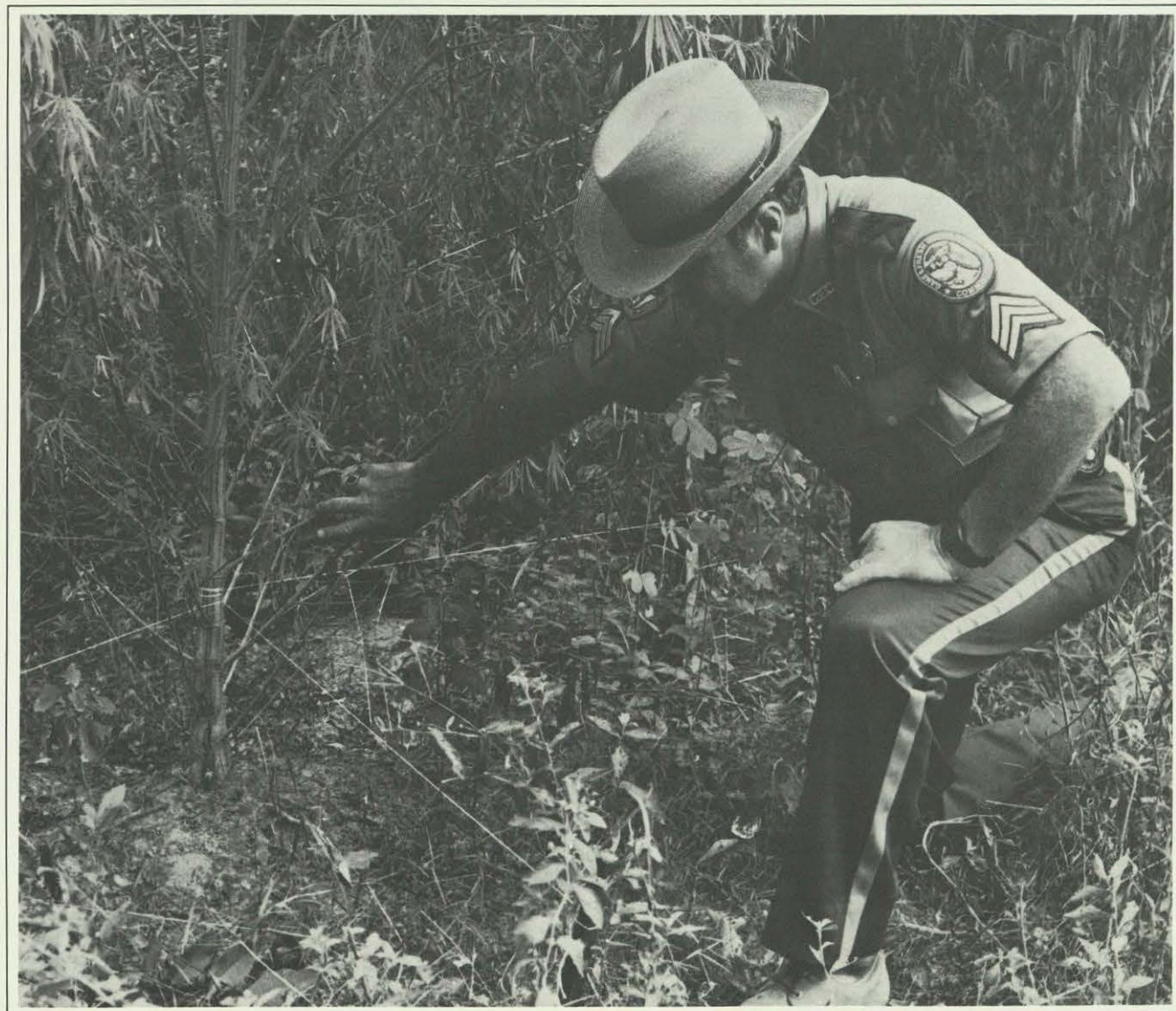
Question: I read recently that wildlife officers made arrests for illegal sale of deer as well as arrests for drugs and illegal possession of automatic weapons. What gives? I thought wildlife officers only enforced conservation laws!

Answer: Wildlife officers are licensed law enforcement officers and are empowered to make arrests for violations of all state laws including those pertaining to traffic, arson, cattle rustling, burglary, drugs and other offenses. Wildlife officers frequently encounter a wide variety of violations on their conservation patrols, so it is vital that they have authority to take quick action to protect the lives and property of citizens.

Because of their unique search authority on wildlife management areas and other state lands, many people regard wildlife officers as having a greater degree of law enforcement authority than other police officers in the state.

With their authority and training, wildlife officers are able to provide a substantial degree of protection to outdoor sportsmen and landowners in rural and wilderness areas where other law enforcement officers rarely patrol.

Floridians may rest assured that wildlife officers will never lose sight of their primary conservation role but will continue to make other arrests as necessary when violations are encountered during wilderness patrols. ●



PHOTOGRAPH BY STAN KIRKLAND



Sixth Annual **FLORIDA WILDLIFE** Photography Contest

The sixth annual *FLORIDA WILDLIFE* photography contest focuses on four wildlife and natural resources categories this year. You may submit up to three slides in any of these four categories: Wild Birds; Wild Mammals; Wild Animals other than Birds and Mammals; or Florida's Natural Environment.

The official photo contest form may be photocopied. Please read and follow all of the rules carefully. The submission deadline is June 30, 1989. Winning photos will be featured in the September-October and November-December issues. We'll look forward to viewing your images of Florida's diverse wildlife and spectacular natural beauty.

Submission Deadline: June 30, 1989

CONTEST RULES:

1. Only original 35 mm slides and 2 1/4 x 2 1/4 inch color transparencies are eligible. DO NOT SEND PRINTS, NEGATIVES OR DUPLICATE SLIDES. Print your name on the slide mount for each entry.
2. Each entry must be accompanied by a completed entry form indicating the category of competition. Photocopied forms are acceptable, if signatures are original. A model release form must accompany entries in category D (the only category where people can be included in the photograph).
3. Up to three individual slides may be entered in any of the 1989 contest categories. Entry forms must be labeled to show in which category each photograph is being entered. The 1989 categories are:
Category A — Wild birds.
Category B — Wild mammals.
Category C — Wild animals other than birds and mammals, including reptiles, amphibians and insects.
Category D — Florida's natural environment. This is the only category which may show people or man-made objects.
4. Entries must be accompanied by a self-addressed stamped envelope for each category. Attach sufficient postage to assure return. Do not send money. Entries will be returned after winners are announced in the September-October and November-December issues.
5. Each slide entry must be attached to a 3 x 5 inch card with the photographer's name, mailing address and Social Security number printed or type-written on the card.
6. Only slides taken in Florida are eligible. Captive, domestic and exotic species are not eligible. Employees of the Florida Game and Fresh Water Fish Commission are not eligible.
7. Only photographs that have never been published in a magazine are eligible.
8. Entrants are responsible for notifying FLORIDA WILDLIFE of mailing address changes.
9. Entries must be mailed to FLORIDA WILDLIFE PHOTO CONTEST, 620 South Meridian Street, Tallahassee, Florida 32399-1600 and must be received by June 30, 1989.
10. Any entry not meeting all the rules will be ineligible. Decisions of the judges will be final.

Official Entry Form

CATEGORY: (Circle One) A, B, C, D

Please Type or Print Plainly

Photographer: _____

Mailing Address: _____

City: _____

State: _____ ZIP: _____ Number of Entries: _____

Photograph No. 1 was taken in _____ County
and is _____

Photograph No. 2 was taken in _____ County
and is _____

Photograph No. 3 was taken in _____ County
and is _____

I certify that I am the photographer and owner of these entries (photographs) and that all entries were taken in Florida, and I hereby give the Florida Game and Fresh Water Fish Commission my permission to publish my entries in *Florida Wildlife* in accordance with the rules published in the March-April 1989 issue.

Signed: _____ (Entrant)

Social Security Number: _____

Model Release

I, _____ (model's name),
for good and valuable consideration, do hereby give
_____ (photographer's name)
and *Florida Wildlife*, an information and educational
periodical magazine published by the Florida Game and
Fresh Water Fish Commission, an irrevocable right to use
my name (and any fictional name) and photograph for
publication in *Florida Wildlife*. I have read this release and
fully understand its contents.

I affirm that I am 18 years of age or older.

Witness Signature: _____ Signed (Model): _____

Address: _____ Address: _____

Date: _____

Guardian's Consent for Minor Models

I am the parent or legal guardian of the above-named
minor and hereby approve the forgoing Model Release
and consent to the use of said minor's name and photo-
graph as aforesaid.

I affirm that I have the legal right to issue such consent.

Witness Signature: _____ Signed (Guardian): _____

Address: _____ Address: _____

Date: _____

Hunter Education

By Lieutenant Jill Simmons

Nearly everyone enjoys watching wildlife. However, many have trouble locating animals to watch. With just a little study and practice, you can greatly improve your chances of seeing wildlife when afield.

One of the most important things to learn is which habitat types the animals you wish to locate prefer. Here in Florida we are blessed with a variety of habitat types. Some species may be found in several different habitats while others occur only in one, very specific habitat. Many popular books describe Florida's different habitats as well as species you may expect to find in each. You might check your local bookstores for titles or contact the Game and Fresh Water Fish Commission for recommendations.

Learning to identify animal sign can also provide valuable clues to the whereabouts of wildlife. Tracks can tell you what animals are in a given area and can also tip you off to their movement patterns and direction of travel. Sign that animals leave as they feed can provide additional clues. For example, gnawed nut shells indicate that squirrels are using a particular tree as a food source.

But locating wildlife is just half the problem. How can you get close enough for a good look? Overcoming a wild animal's sense of sight, hearing or smell without being detected is a real challenge. When you're in the woods, you're in the animal's own backyard—on its turf. Wild animals are acutely aware of what's going on around them. It's possible to approach wildlife closely but only if you practice and develop some outdoor skills. Observers should also remember that wildlife is especially vulnerable when nesting or rearing young, and should avoid disturbing animals with offspring.

To overcome a wild creature's sense of sight, you can try several different tactics. Concealing yourself in a camouflaged blind and waiting for animals to come to you is one alternative. If you're looking for deer, sitting quietly in a tree stand, above the animal's normal line of sight, can also bring results. Or perhaps completely camouflaging yourself and slipping silently through the woods is your cup of tea. But remember, if you're a deer hunter you must wear 500 square inches of blaze orange while hunting on public lands. Although not required for hunters pursuing other species, it is nonetheless an excellent idea.

Many animals have a finely-tuned sense of hearing. The clothes you wear and the way you walk can blare out your presence to wary animals. Many clothes are made using synthetic materials, and when twigs and branches brush against them they make a surprisingly loud sound. Wearing clothing of natural materials such as cotton or wool will help minimize such noises.

Sounds made while walking can also frighten animals. Years of walking on hard, smooth surfaces such as

floors and sidewalks make for clumsy movement on the uneven terrain encountered in the field. There are two ways to move more silently. First, completely change the manner in which you take your steps. People normally walk by stepping first on the heel and then the toe. Try coming down on the ball of your foot first and then bringing down your heel. You'll be surprised how quiet this method of walking is. Secondly, wear soft, thin-soled shoes such as moccasins, weather permitting. You will be able to "feel" any twigs or branches before they snap.

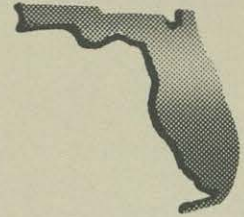
Overcoming an animal's sense of smell can be a real problem. There are basically two things you can do. Try staying downwind as you approach the animal so the breeze won't carry your scent toward it. But keep in mind—the wind is often fickle and can change in an instant, blowing your scent toward the animal and causing it to flee. You might want to consider masking your scent with a substance that covers or hides human odor. There are many different types on the market to choose from. Just make sure that the scent you select is familiar to the animal you're pursuing and that it doesn't smell like something frightening. For example, though northern deer are familiar with apples and associate their smell with something good to eat, Florida deer have no idea what apples are.

By learning how wild animals function in their daily lives and by sharpening your outdoor skills, you can greatly improve your ability to locate and see wildlife. You might want to consider taking one of the Commission's free hunter education courses to receive some more tips. For information on the next class in your area, contact the hunter education officer at your nearest Commission office. 📍



PHOTOGRAPH BY LEONARD LEE RUE III

Delicate Balance



Species: Southeastern American Kestrel (*Falco sparverius paulus*)

Florida Status: Threatened

Federal Status: Under review for listing

The American kestrel (*Falco sparverius*) is a small falcon, about the size of a blue jay, with long pointed wings. The female is rufous-brown with black barring on the back and brown streaking on the breast. The male has a rufous-colored back and tail, and is distinguishable from the female by his blue-gray wings and black and white tipped tail.

There are two subspecies of kestrels that occur in Florida: *Falco sparverius paulus*, a permanent resident, and *Falco sparverius sparverius*, the northern subspecies and winter migrant. The northern subspecies is usually slightly larger in both sexes and the northern males have more spotting on the breast and flanks. There is a great deal of variation within this subspecies, however, and these characteristics do not always provide reliable distinction.

Resident kestrels remain paired within their breeding territory year-round, where adequate feeding and nesting habitat exists. These dual requirements cause resident birds to occupy different habitats than migrants. Although agricultural fields and pastures provide excellent feeding habitat and are routinely used by winter migrants, they often lack suitable nesting trees. Consequently, most resident kestrels live in sandhill plant communities characterized by longleaf pine and turkey oak trees. These areas are relatively open and provide numerous snags for nesting.

Courtship begins toward the end of January, and from mid-March



PHOTOGRAPH BY DOUG RUNDE

through May, the female lays three to five eggs in a nesting cavity. The nest is usually located in a woodpecker hole 15 to 40 feet above the ground in a pine snag. During the nesting period, the male kestrel is the principal food provider for the female and young. In Florida, the kestrel's main prey is insects, with lizards being a very important food source during the summer. Unlike their northern counterparts, southeastern kestrels rarely capture small mammals and birds.

Because kestrels are frequently seen in winter, the species is apparently holding its own. Trends for the two subspecies differ,

however. Populations of the northern subspecies are remaining stable or even increasing in some areas, whereas Florida's resident population has actually declined and is presently listed as threatened in the state.

Examination of historic records made by oologists that collected eggs from southeastern American kestrel nests throughout Florida revealed that much of this subspecies' habitat has been lost through development or clear-cutting—the major cause of its decline. Mechanized agriculture, particularly the removal of longleaf pine snags from open fields, contributed significantly to the decline of kestrels in north Florida. In south-central Florida, the extensive conversion of upland pine woods to citrus groves eliminated both nesting and foraging habitat for kestrels and is believed to have been a major factor in the species' decline in this part of the state.

The decline of kestrels in Florida can be reversed. Proper management of pinelands, including retention of snags for nesting woodpeckers and kestrels, is an essential component to the long-term solution to this problem. However, a nest box program aimed at attracting kestrels to otherwise suitable area is a viable short-term management effort until acceptable nest sites are established. Efforts are underway to establish an active nest box program that can have a significant impact on our southeastern American kestrel population. 🦅

—Michael W. Collopy



PHOTOGRAPH BY PATRICK HAGEN

Responsible Wildlife Watching

By Mary Tebo

Eager to sight a black rail, the birdwatchers turned on their tape player and broadcast its call over the marsh, hoping to get a live response. A distant "kickee-doo" rewarded their efforts, and they trooped through the tall grass toward the sound. The call grew louder as they marched, but then it ceased. They played their tape-recorded message in vain until finally, looking down, one of them saw that they had trampled the small black bird underfoot.

If only this story were just a tasteless joke! But it isn't. A California birding group was horrified to find that they had killed the creature they longed to see. If a

group of seasoned birdwatchers—supposed "innocent spectators"—can have such a dread impact on the wildlife they watch, then we are all well-advised to ponder the ways we affect the animals we contact.

Wildlife researchers and land managers have historically divided wildlife enthusiasts into two groups, consumptive and nonconsumptive. Consumptive wildlife-users are people who remove animals from the habitat, such as hunters and fishers. Nonconsumptive wildlife-users are people who simply watch animals, through binoculars and cameras, from their cars, their kitchens, or in the depths of the wilderness. The activities of

consumptive users are strictly regulated, as their encounters with the animals they seek are usually lethal. The activities of nonconsumptive users have not been nearly so strictly constrained, as it first appeared that watching wild animals had no ill effects.

However, the number of nonconsumptive users—wildlife watchers—has grown exponentially over recent years. According to a U.S. Department of the Interior survey, 67 percent of Americans 16 years or older participate in observing, photographing, and feeding wildlife near their homes, with many traveling some distance just to see wildlife. These multitudes

are most visible at the great national parks in the West, such as Yosemite, Yellowstone, and Rocky Mountain, and that is where most researchers studying wildlife viewers' impact have gathered data. For example, one study showed that, as hikers traveled to mountain-tops to get a look at bighorn sheep, the sheep sought higher and higher altitudes to evade them. The colder weather at higher altitudes took a higher toll of bighorn kids—thus aggressive wildlife watching had a direct, adverse impact on these animals.

Florida Game and Freshwater Fish Commission surveys show that over seven million Floridians participate in some type of nonconsumptive wildlife activity. Over two million take trips for the primary purpose of seeing, hearing, and photographing wildlife. Although it's heartening to know that so many Floridians want to watch wildlife, this increasing fan club is ever more likely to disturb the lives that are the focus of all the attention.

The wildlife we most affect is the wildlife most accessible to us, and as more and more of us walk the beaches, dive and canoe the rivers, spelunk through caves and trek through the woods, few animals can escape us. Our urge is to reach out—reach out and touch. What we forget is that the creatures interpreting our gestures do not speak our language, are not members of our culture—in short, are not human. Though closeness and contact are expressions of good will among people, other species usually don't recognize or appreciate our friendliness. And often photographers, striving to immortalize the intimate moment, forget they likely appear as terrifying strangers.

By trying to get close to wild animals we often threaten them during the most crucial stage of their life history: reproduction. If we fluster them as they go through the process of conceiving, bearing, and rearing offspring, we threaten not only the individual animals we are watching but also future generations. Many species have

fascinating courtship rituals, but we can easily disrupt them if we crowd too close to watch. Animals are even more vulnerable when they are tending their young, and parents are more than a little bit nervous about human intruders. Think about it, how would you feel about a large, potential predator roaming the local daycare center? Frenzied with concern, a parent animal can easily injure or kill itself or its young as it tries to cope with this alarming situation.

Even if we don't threaten wildlife during their reproductive stage, we can have a profound effect on individuals simply by startling them from the daily routine of survival. Some animals barely subsist on meager diets, and if they have to spend energy fleeing—worse yet, abandoning a transient food source—they have suffered some degree of harm. Another disadvantage of flight is that the animal may expose itself to predators or other environmental hazards. Though one viewer may disturb an animal only once and that one encounter may not have dire consequences, the odds of repercussions go up with repeated disturbance, particularly in heavily-visited wildlife areas.

At Ding Darling National Wildlife Refuge on Sanibel Island near Sarasota, University of Florida student Mary Klein has been studying the impact of wildlife watchers—650,000 visitors annually—on the many species of birds that court, nest, and feed there. One of Ding Darling's major attractions is Wildlife Drive, a five-mile, one-way auto tour route that hugs the top of an impoundment built through the mangrove swamps during the 1950s mosquito control effort. Klein followed Wildlife Drive users without their knowledge to observe their interactions with wild birds.

"The number of people actually harassing birds was low," she said, "but occasionally someone would come along and really disturb them. Some photographers, for example, could be very disruptive in that, if a bird flew down the road, the

photographer would follow with all his paraphernalia and continuously disrupt the bird. Also, I saw a lot of people throw pebbles at birds because they wanted to see them fly—wanted to see the marks on their wings so they could identify them."

Beyond documenting the obvious effects of the sheer volume of public use, Klein also noted a phenomenon she called "mobbing"—numbers of people crowding so close to watch animals as they courted or fed that they disturbed normal behavior patterns.

"Yellow-crowned night herons do a wonderful courting display that's really fun to watch," she explained. "But occasionally so many people would get so close that the birds would break off courtship to fly to a safer distance. Or a heron, for example, might be struggling to catch a fish. Distracted by a crowd of people it might lose it."

Klein pointed out that wildlife is always facing stringent demands and constraints in the natural environment. Timing is a crucial factor in many birds' survival strategies—courtship is seasonal, and mating must occur before the nesting season. Feeding is limited by the tides, so undisturbed access to mud flats during the short time they're exposed is important.

Nor do wild animals have boundless reserves of energy. Klein described a black-necked stilt that had made a great show of dive-bombing oblivious strollers that walked too close to its cryptic nest. Calories the bird burned in defense display were no longer available for searching out a meal or dodging real predators.

"I guess it boils down to consideration," she said, "awareness of the repercussions of our actions. The birds are much less disturbed when people stay at a distance, watching through binoculars or photographing through a zoom lens." She further noted that birds are "vastly more at ease with a car than with the sight of a person."

Another refuge resident, the alligator, was the focus of a study launched last spring by Doug ▷



PHOTOGRAPH BY TOM EVANS

Mackey, Chief Outdoor Recreation Planner at Ding Darling NWR. Concerned that the "Alligator Feeding Prohibited" signs were promoting people/alligator conflicts by specifically indicating the reptiles' hangouts, he and volunteers from the Sanibel-Captiva Audubon Society studied interactions between visitors and alligators at the end of Wildlife Drive.

"People are fascinated with alligators," he said. "They look like leftovers from the dinosaur era—and in many ways they are. We need to be careful, though, not to let our curiosity take us to the point that we want to see what an alligator will do when it's disturbed."

Many people observed in this study, however, could not resist lobbing various objects at alligators to get some kind of reaction. Of almost 2,000 visitors that got out of their cars, 49 threw food, stones, or other things at nearby alligators. Mackey pointed out that, while it might look like an alligator is just drowsing, basking in the sun actually fulfills the important function of raising the cold-blooded

alligator's body temperature so it can carry out many of its vital functions. Thus continuously driving it into the water can have profound thermoregulatory effects that stone-hurlers probably never considered.

"Besides, it is just as fascinating to watch an alligator lying still," said Mackey. "In reality they aren't still. Look to see the part of the alligator that is moving. See how the alligator is interacting with its environment, even though it doesn't seem to be moving at all."

More numerous than those who tried to make alligators move were those who moved in on alligators. Fifteen percent of the visitors observed—182 people—approached to within ten feet of alligators, with six people actually touching them. Though none of these encounters developed into violent confrontations, it's puzzling why people would tempt such an accident. Alligator attacks may or may not be fatal for humans, but they're almost always deadly for alligators, which are usually destroyed whether their aggression

was provoked or not.

"I've seen people set their child on a bank rather close to a large alligator and then step back and take a picture," said Mackey. "Some ask if it's right to protect visitors from their own ignorance. The refuge staff is committed to providing a safe environment. We are also committed to providing a rustic wildlife experience unencumbered with countless regulatory signs. It's a fine line."

As a result of the study, Ding Darling NWR is considering several courses of action, including creative ways of separating people and alligators as well as educating people about alligators. One effective method of consciousness-raising, though it would be hard to implement, presented itself in the observations of a volunteer researcher: "He sat down, put his body in the water, and nudged the gator with his foot. He then threw rocks, and a night-heron flew over and bombed on him."

Another Florida animal that has trouble with overly intimate people is the manatee. Manatees



PHOTOGRAPH BY DOUG PERRINE



PHOTOGRAPH BY ROBERT S. BLOUNT III

congregate at springs during the winter months. There the water temperature is tolerably warm compared to the open ocean, but they are at the mercy of curious human observers. Despite much advice to the contrary, some divers insist on trying to grab and ride the manatees. These large, gentle mammals are disturbed by such approaches, but can only prevent them by trying to evade their pursuers. Thus people may drive manatees to leave their winter sanctuaries, forcing them to colder waters where food may not be plentiful and where motorboats, the manatees' most serious threat, may be more frequent.

Chassahowitzka National Wildlife Refuge, situated at Kings Bay on the west coast of Florida, one of the manatees favorite over-wintering spots, distributes guidelines on underwater etiquette for people swimming around manatees. Good manners are mandatory—people are ticketed if they are seen harassing manatees. Harassment includes feeding manatees, touching them before they touch us, holding onto

manatees though they try to break away, and encircling manatees or barricading their passage.

"When you've just come down from Ohio and spent \$300 on your plane ticket, \$100 on the hotel, \$100 on equipment, just to see manatees, it's really hard not to try to touch them," said Sheryl Buckingham, a University of Florida student studying the effects of humans—boats and swimmers—on manatee distributions. "But when there are 300 visitors a day, that's a lot for a manatee to deal with."

Bats, especially endangered gray bats, are also especially vulnerable during the winter. Storing just enough fat to get them through the cold season, they hang from the tops of caves and sleep the heavy sleep that goes with a low metabolic rate. Waking up increases the rate at which they burn their fat reserves, and spelunkers that rouse a colony of sleeping bats can unintentionally cause them to use energy that would otherwise carry them through the winter.

"The best thing to do when you see bats in a cave is to leave,"

advises Game and Fresh Water Fish Commission biologist Jeff Gore.

"Though it might look like the bats are continuing to sleep, even a little light or noise will bother them and they'll begin to emerge from hibernation—a process that might take as long as six minutes. And once they're awake and active, they've already burned up valuable energy."

Gore said that bats are also sensitive during the summer months, when they are raising their young. If mother bats are flushed from their roosts they can easily drop babies clinging to their breasts onto the wet, mite-ridden floor below. "The best thing to do is to keep your eyes open for bats and, if you see any, go the other way. Leave the cave to the bats."

Though the remedy to disturbing wildlife—leaving it completely alone, staying at a distance, hands off—may seem like bitter medicine, it is a prescription that preserves the well-being of species that share Florida's waters, woodlands and caves with us. Wild animals have spent eons evolving the routines by ▷

which they mate, nest, feed, avoid predators, and thermoregulate. When we disrupt them, we can unwittingly trample and destroy their schemes for survival.

When we make trips to watch wildlife, we often forget that there can be more to the experience than just sighting the animal. A wild creature is more than just a body in a landscape; it's a whole system of senses, responses, and adjustments. Its behavior is just as intriguing and unique as its shape, size, and physiology. As Doug Mackey said of alligators—though they seem still, they're not. Animals are constantly perceiving their surroundings. True discoveries follow when we observe alertly but unobtrusively, watching other species as they interact, not with us, but with the environment that shaped them.

Tips for Wildlife Watchers

- **Stay on well-traveled roads and trails.** Animals can become acclimated to people as part of their environment if people stick to a standard routine.
- **Stay in your car or canoe.** Animals are much more at ease with us if they can't see our animated faces, flailing arms, moving feet.
- **Give animals lots of space.** If they flee, don't run after them. Wait until they settle; then, allowing them to keep you in full view at all times, walk calmly, slowly, quietly toward them. Make every effort not to cause them to bolt. (To state the obvious, don't throw things at them.)
- **Watch for distress signals that might indicate that you're threatening an animal's nest or young.** For example, shorebirds will circle and cry.
- **Don't feed wild animals.** When animals rely on people for food the situation can become dangerous for everyone involved.
- **Leash your pets.** Dogs are carnivorous and their instincts compel them to chase and devour suitable prey. Unfortunately, many wildlife species look delectable to them.
- **Know what animals occur in the area you're visiting and what they might be doing while you are in their habitat.** Our awareness is wildlife's best protection. 🐾

PHOTOGRAPH BY DOUG PERRINE





PHOTOGRAPH BY LEE KUHN

Bird Watching Basics

By Jim Cox

With this issue of *FLORIDA WILDLIFE* we bring you the second installment of "Bird Watching Basics." The first installment, which appeared in the January/February issue, gave advice on how to choose a helpful field guide and a good pair of binoculars, as well as tips on how to use these indispensable tools. Here, we tackle the ultimate birding endeavor: identifying birds.

IDENTIFYING BIRDS

By now you're familiar with the organization of field guides and with some of the different families of birds. You've got binoculars and can spot an object with your naked eye and then look at it through the

binoculars without having to search for ten minutes. Most importantly, you've avoided the frustration—so far—of trying to associate a particular name with a particular bird. Now, to accomplish this feat, let's go over some helpful techniques for learning to identify families and species of birds.

The first thing to remember is: *don't make bird identification hard on yourself*. There are two general rules to keep in mind during your first few months of bird watching: 1) eliminate as many species as possible from consideration before you ever attempt to identify anything, and 2) the bird is most likely a species that commonly occurs in your area, not some strange exotic that blew in from a thousand miles away.

These rules are closely tied to one another, and they focus on making birding easier by reducing the number of choices you have to consider. For example, in Florida there is only one type of hummingbird that occurs regularly, the ruby-throated hummingbird (verify this from your field guide, if you like). Several other hummingbirds have been seen in Florida on occasion, but why worry about trying to identify these uncommon vagrants until you have more experience with our most common species?

One of the easiest ways to exclude birds is to go through your field guide and put an "X" next to those that do not typically occur in your geographical area. Put these aside for ▷

the time being. By doing this you drastically reduce the number of birds you have to worry about identifying, since there are about 300-400 birds that are regularly seen in Florida! By the way, don't worry about marking up your field guide. A field guide personally adjusted to meet your needs is the best friend you can have when alone in the field. I kept extensive notes in my first field guide—in fact, on one page it was hard to see the drawings amid all my scribbles. Just be sure to use a pencil or permanent ink so that the words won't smear if you leave the book in the rain or drop it in the mud occasionally.

I received a long-distance phone call the other day from a woman who thought she had a spotted owl in her backyard and wanted to know why she couldn't find the bird in her field guide of eastern birds. It's no wonder! Spotted owls occur in several western states but they're as rare as two-pound diamonds east of the Rockies. This woman had recently seen a picture of a spotted owl in *Natural History* magazine, so when she saw an owl that looked like the picture she immediately went looking for spotted owls in her field guide, passing right by barred owls, which look similar and, more importantly, are common throughout the Southeast. It took me approximately ten minutes to convince her that it might be a barred owl and that perhaps she should look more closely at this bird. She eventually agreed with me, but this was a perfect case of a beginning bird watcher making things harder than they had to be.

Another way to eliminate choices is to consider the time of year the bird might occur in your area. The range maps included with field guides display this type of information, but many beginners learn more quickly if they simply place a colored dot next to the picture of the bird. For example, put a red dot next to birds that are year-round residents, put a blue dot next to birds that are winter visitors but leave Florida for the summer, put a green dot next to birds that are summer-time visitors but leave

Florida during the winter, and put a black dot next to birds that pass through Florida during migration.

The range maps and information presented in field guides help determine whether a bird is common or rare, migratory or residential in your area, but a more precise information source is the Commission's "Checklist of Florida Birds," prepared by Dr. Henry Stevenson. This checklist provides information on the relative abundance and time of occurrence for all birds officially sighted in Florida. By referring to this booklet, you can make very exact notes in your field guide about the status of different species. Write to the Nongame Wildlife Program, Florida Game and Fresh Water Fish Commission, 620 S. Meridian St., Tallahassee, FL, 32399-1600 for free copies of this publication.

These procedures will quickly eliminate a lot of confusing birds from consideration. For example, there are approximately 180 birds that breed in Florida and another 20 or so that hang around in small numbers during the summer. So if you see some unknown bird in the middle of July, don't consider the 700 species shown in your field guide. Instead, you only have to choose from 200 or so different birds. Simple, right?

Identification Clues

The way that some birds skulk about, you'd think that they were afraid of showing off their pretty colors and didn't want anyone to identify them. And this is the case, no doubt, as they must somehow evade predators from both above and below. Often their quick movements allow us only a fleeting glimpse. Despite birds' shyness,

however, there are five basic clues you can look and listen for that will allow you to solve the bird identification puzzle: 1) the bird's silhouette, 2) its plumage and coloration, 3) its behavior, 4) its habitat preferences, and 5) its voice.

This may seem like a formidable amount of information to gather, but in truth you often need only one or two of these clues to identify a bird. Sometimes the key to identification is simply knowing which clue to look for first when you see an unusual bird. As your birding abilities increase, you will be able to pinpoint the important clues with greater ease and certainty.

Silhouette

The mere outline of a bird is sometimes all that's needed to know which bird you're seeing. There's really a lot more information in a silhouette than you may initially realize. For example, from a silhouette you can tell whether a bird is large or small, short-legged or long-legged, crested or not crested, plump and roly-poly or slim and sleek, long-billed or short-billed, short-tailed or long-tailed, etc.

Size is an important aspect of a silhouette that is often very difficult for many learning birders to grasp. This trouble results partly because field guides vary the scale of their drawings from page to page to show appropriate details. Often a very large hawk on one page appears to be the same size as a small flycatcher on another page.

Field guides do list the size of birds in inches next to the pictures, but if you don't have some type of scale in mind these numbers are of little use. The "ruler" that I recommend beginners take into the field is a mental association of three



familiar birds with three general size classes. For example, an English sparrow is 5-6 inches in size, a mockingbird is 9-11 inches in size, and a common crow is 17-21 inches in size. Now, using phrases like "larger than a crow" or "smaller than a sparrow," you have an immediate impression of the approximate size of any bird. You also have an immediate frame of reference for your field guide if you associate each of these three species with 5, 10, and 20 inch size classes.

The shape of a bird's bill is also an extremely helpful clue that is obvious from a silhouette. Finches, like cardinals, have short conical bills. Woodpeckers have chisel-shaped bills for working dead wood. Hawks, eagles, and falcons, on the other hand, have sharp, hooked bills that make quick work of meat.

Plumage

Plumage characteristics are what

really draw a lot of people into bird watching—they like seeing those pretty colors. The distinguishing plumage clues that identify different species are known as "field marks" and these include such things as breast spots, wing bars (thin lines along the wings), eye rings (circles around the eyes) and, of course, coloration.



Many field marks are concentrated around the head, so don't worry about checking the more discrete parts of a bird's anatomy. Pay particular attention to whether or not there is a dark line running "through" the eye (an eye line), a stripe above the eyebrow,

whiskers along the side of the face, or a crown on top of the head.

Some field marks are best seen when a bird is in flight. A flying marsh hawk can be identified from nearly a mile away with good binoculars because the bird has a bright white patch on its rump. Northern flickers also have a noticeable white patch on their back and rump, which is easiest to see when the bird is in flight.

Some families of birds can be broken into even smaller groups based on one or two simple field marks. For example, warblers are fairly evenly divided between those that have wingbars and those that do not. So if you see a warbler-like bird, look quickly to see if it has wingbars. Sparrows, on the other hand, can be separated into two smaller groups based on whether or not the breast is streaked. Look for other broad distinctions for other families. ▽



PHOTOGRAPH BY TOM EVANS



Mockingbirds

PHOTOGRAPH BY CHARLIE HEIDECKER

PHOTOGRAPH BY LYNN STONE

Barred Owl

Behavior

A bird's behavior—how it flies, forages, or generally comports itself—is one of the best clues to its identity. Hawks have a "serious" demeanor, crows and jays are "gregarious," and cuckoos are ... well, not really. Woodpeckers climb up the sides of tree trunks searching for grubs like a lineman scaling a telephone pole. Flycatchers, on the other hand, wouldn't climb a tree trunk if their lives depended on it. They spend most of their time sitting upright on an exposed perch. When they see a bug cruising into range they quickly dart from their perch, snag the meal, then return to the same perch or another one nearby. Finches spend a lot of their time on the ground in search of fallen seeds, as do mockingbirds, catbirds, and brown thrashers. Some wading birds, such as snowy egrets and reddish egrets, are very active foragers and chase their prey around

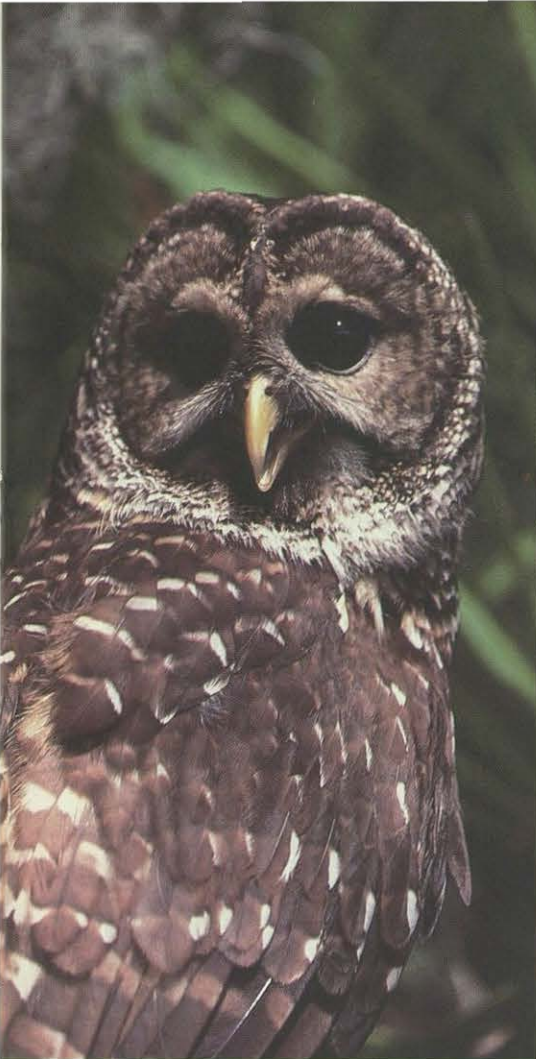
in shallow waters. Other wading birds, such as great blue herons, are less impetuous and hunt slowly, with great patience and stealth.

Even the way a bird props its tail gives some clue as to which species or family it might be. Wrens characteristically hold their tails in a cocked position and often bounce from side to side. Spotted sandpipers and Louisiana waterthrushes bounce their tails and rumps rapidly up and down as if doing a stylish dance step. Some thrushes and flycatchers, on the other hand, move their tails frequently but slowly, with a wave-like motion. You can even identify some birds just by the way that they fly. Most finches and woodpeckers move through the air with an undulating flight pattern, flapping their wings in short bursts and then tucking them under for a short rest. One group of hawks, the falcons, flies with strong wingbeats and rarely hovers. Another group, the

buteos or soaring hawks, circles the sky suspended on outstretched wings. Yet another group, the accipiters or bird hawks, usually flies in a straight line with alternating periods of flapping and floating.

Habitat

Even though a bird occurs in your neck of the woods, this doesn't mean the bird will be common wherever you go. Birds segregate themselves according to habitat type and are sometimes quite picky in selecting an area as home. Wading birds and ducks, for example, prefer watery habitats rather than dry upland areas. Pine warblers and brown-headed nuthatches associate primarily with pinewoods and are less common in areas containing large numbers of oaks, hickories, and other deciduous trees. Some Florida birds, like the snowy plover, are restricted primarily to the sandy



coast, while others, including the limpkin, occur mostly along river swamps and freshwater marshes.

Beginning bird watchers must usually spend many hours afield before they are able to associate different species with different habitat types. I suggest that you develop a key to habitats that you frequent and keep notes of where you see different species. Make the habitat key simple at first, using terms like salt and freshwater marsh, pinelands, deciduous forest, beach, urban area, farm and pastureland, etc. Then elaborate on it as you learn to distinguish among different Florida habitat types. You can put abbreviations such as "SM" (for salt water marsh), "PW" (for pinewoods), and "FP" (farm and pasture) next to the pictures of birds in your field guide after you have some feel for where the birds occur. Most field guides actually provide this information in the written description accompanying different

species, but this abbreviation system may help save time.

Voice

I've often thought it would be rewarding to teach blind people how to "bird listen." Most birds have unique songs and calls, and once you've gained a few years of experience, voice is all that's needed to identify many of the birds you encounter. Bird calls are a form of advertisement that is usually directed specifically to other members of the species. If each species didn't have a distinctive call or song, there would be a lot of confusion out there. Just as you can tell that the person on the other end of the phone is Uncle Ned and not Aunt Jora, so too can you learn to distinguish the different voices of birds.

Some people find that listening to tapes and records helps them to learn the calls of birds. Dr. William Hardy has produced a record specific to Florida called *Sounds of Florida Birds* that may be of help. It is available at some local nurseries and outdoors stores. However, nothing helps you learn a call better than hearing the call, finding the bird that makes the noise, and then simply watching the bird sing for a moment. There's something about the association of voice and bird that helps to fix both in memory.

Additional Tips

Going afield with experienced birders can often help to speed you along the bird identification learning curve, and a variety of private and public groups offer bird tours throughout Florida. The local chapter of the Audubon Society is perhaps the best starting place to find out more about birding trips in your area. Write to the Southeast Region of the National Audubon Society (928 N. Monroe Street, Tallahassee, FL 32303) to get more information on your local chapter.

There's also a nice guide to the birding hotspots in Florida, written by James Lane. Simply entitled *Birding in Florida*, Lane's book is available at some outdoors shops,

nurseries, and at many national wildlife refuge visitor centers. This book contains very valuable information on where to go and what to expect to see for many different areas of Florida, as well as fairly detailed maps to the areas.

Birding is not the easiest sport in the world to learn, but is definitely one of the most rewarding. To offset those first outings when you frustratedly flip through your field guide, there will be many years worth of pleasant and intriguing field trips. You see, birders learn something new every time they go out. If they don't actually see a new species for the first time, they might see an old species do some new trick. They might even come across something startling, like a rare European bird that somehow strayed far from home.

The constant variety and challenge of birding are two important attractions, but so too is the camaraderie. At last count, there were something like four million active bird watchers in the United States and another 10 million casual bird watchers. That's a lot of people poking their heads into bushes and craning their necks toward the sky.

I've developed a good number of lasting friendships as I've cruised some isolated road and happened across a kindred soul bedecked with binoculars and a field guide. We shoot the breeze for a while, exchange notes on what we've seen that day, and then we walk along together for a short while to find out what new birds are hiding in the bushes ahead.

Later, we go our separate ways but, before parting, we might exchange phone numbers with this request: "If you ever find something good or want to go out sometime, give me a call."

You're never alone when you're a birder.

Jim Cox is a biologist with the Commission's Environmental Services Division. He assists in protecting important wildlife habitat and conducting nongame bird surveys. He occasionally teaches birdwatching classes for Florida State University. ①



Purple Gallinules

DEE SMITH

Our featured artist, Dillwyn "Dee" Smith, likes to tell a story in his "photo-realism" style oil paintings. He spends many hours in the field observing characteristic traits and mannerisms of animals so he can accurately depict Florida's diverse wildlife. The images are so life-like that the subjects seem to fly, walk or swim right off the canvas.

A native Floridian, Smith remembers that his interest in nature was awakened as he grew up in the "small town" of Miami, then surrounded by Florida pines and sawgrasses. Since metropolitan Miami no longer offers the variety of wildlife subject matter he depicts in his paintings, Dee and his wife often travel further south into the Everglades. The Smiths motor their open fishing boat, "Our Tern," through the marshy waters around Flamingo Key in the Ten Thousand Island area in search of the elusive swallow-tailed kite and other rare and endangered birds.

"For sheer diversity of wildlife, you just can't beat the Everglades," he says of these favored stomping grounds. His subjects range from birds to marine life and he also enjoys the proximity of the Bahama reefs, where he dives and photographs sea creatures. The Smiths often travel upstate into the Ocala National Forest to enjoy

camping and canoeing, always on the lookout for deer, raccoon, and other forest dwellers.

A self-taught artist, Smith tried several painting media before selecting oils.

"I prefer oils because of their color value and workability. They offer many advantages such as the option of accelerating the drying process by adding a drying agent when I'm painting finely-detailed work. Another option is to retard drying by mixing paint with an oil that will thin the paint which works especially well when rendering clouds or water," Smith explained.

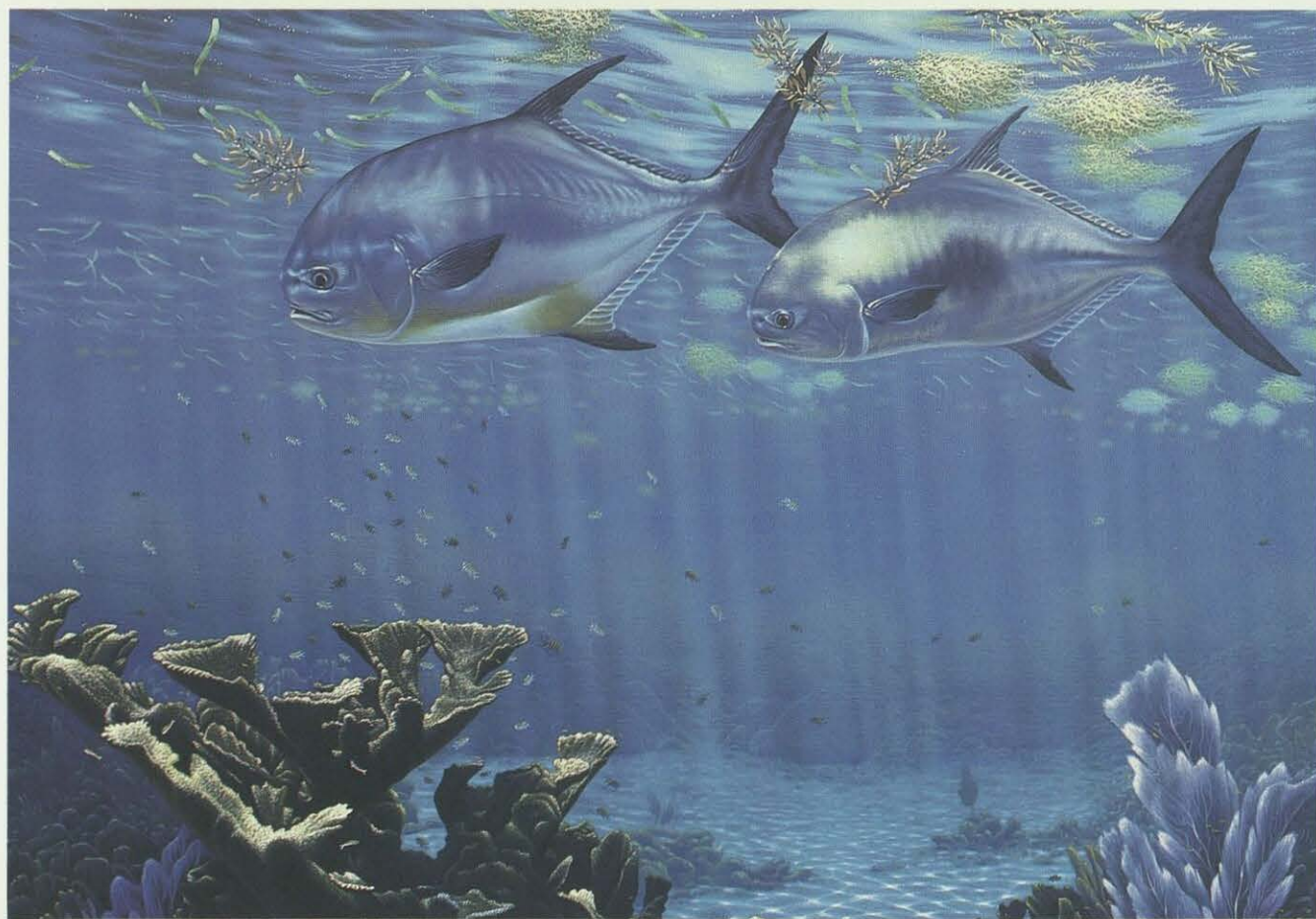
Before he begins to apply paint, he generally uses a very hard charcoal pencil to under-sketch specific feather structure and other anatomical details onto the canvas. He refers to drawings in his field notes and numerous slides while composing the painting.

"Sometimes I'll use 20-30 slides, selecting different views, to portray the subject in the proper background and foreground relationship," he explained. Smith generally uses a 35mm Pentax camera in the field and prefers a 135-600 mm zoom lens which is mounted onto a homemade gunstock steadied with a monopod.

Smith often seeks the solace of the wilderness to find relief from his stressful full-time profession as a fireman. ▸



Red-tailed Hawk



Permit



Broad-winged Hawk

He recreates these memories when he begins sketching and painting his extremely realistic subjects, often incorporating actual field observations as in the swallow-tailed kites depiction, "Prenuptial Gift."

"Three years of patience and perseverance paid off when I witnessed the courtship ritual of the two swallow-tailed kites," he said. "It was a wonderful experience." ①

—Andrea H. Blount



Swallow-tailed Kite

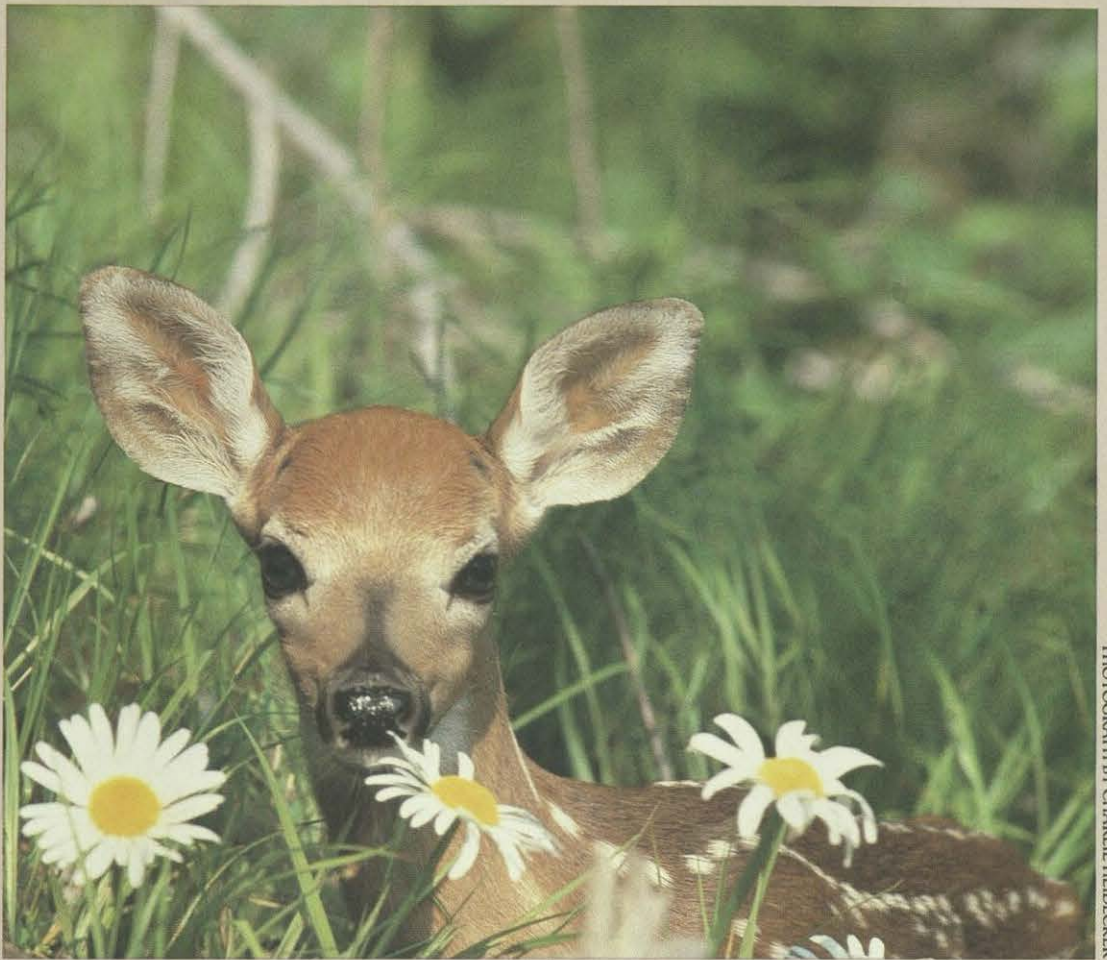


Bottlenosed Dolphins

Spring

PHOTOGRAPH BY TOM ULRICH

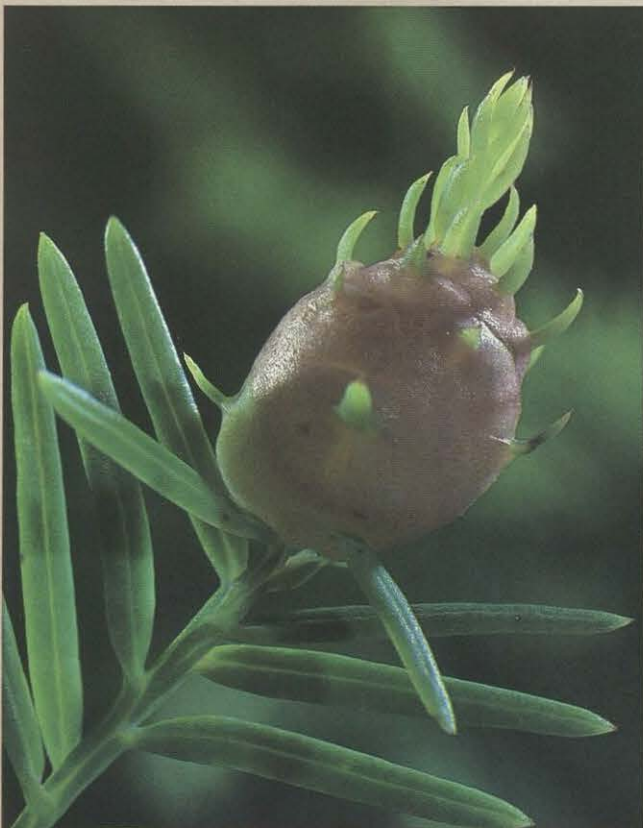
Cardinals



PHOTOGRAPH BY CHARLIE HEIDECCKER

White-tailed Fawn

PHOTOGRAPH BY LLOYD B. HILL



PHOTOGRAPH BY ELSIE I. JONES

Cypress Cone



Young Turkey

PHOTOGRAPH BY LYNN STONE



Pickerelweed



PHOTOGRAPH BY ELSIE L. JONES

Palmetto Blooms

PHOTOGRAPH BY BOB GREWELL



Young Raccoon



PHOTOGRAPH BY MARESA PRIOR

Eastern Black Swallowtail

Recycle Your Bass

A Guide To Handling And Releasing Your Catch

By Phil Chapman

Catch and release bass fishing, a concept practically unheard of scarcely a decade ago, is catching on. Not long ago an angler's level of expertise was often measured in pounds of fillets. Photographs displaying huge strings of bass were frequently featured on the sports pages of newspapers and fishing magazines. But today, the attitude of many bass fishermen is changing. Releasing all, or a large part, of our catch is common as more and more fishermen become conservation-conscious.

The largemouth black bass reigns as king in most of Florida's three million acres of fresh water lakes, ponds and streams. The species is amazingly resilient and able to survive intense pressure and high technology fishing methods. However, biologists face a constantly growing challenge to manage this renewable bass resource. With the influx of thousands of visitors and new residents annually, it is inevitable that demands to maintain quality bass fisheries will only increase.

The threat of overfishing, once thought to be an impossibility, could become reality without adequate concern for bass populations. If Florida's waters are overfished, catch rates may decline, as well as the average size of the catch or numbers of trophy bass available to fishermen. Although high catch rates are an important priority, some anglers place even

greater emphasis on the size of their bass. Practicing catch and release, especially of larger bass, is one of the biggest contributions anglers can make towards the future of Florida's bass fishing.

Thanks to this new attitude, more anglers are finding satisfaction by returning their fish to the water in hopes that they can be caught again. In effect, these bass are being *recycled*. After a brief encounter with a fisherman, the bass is able to resume its role in a complex ecosystem and may also live long enough to give another angler a similar thrill.

Contrary to misconceptions of some anglers, most fish caught and released probably do survive and many are caught again. The black bass is no exception and is actually a fairly durable gamefish species. Unlike the sensitive striped bass and sunshine bass which often fight to exhaustion and poorly tolerate handling, black bass are not as easily stressed. If fishermen use proper care and common sense, uninjured largemouth bass have excellent chances of survival once released.

This article is dedicated to helping fishermen understand how to successfully handle bass to provide these fish with the best chance for quick recovery and survival.

Hooking

Angling techniques and terminal tackle may mean the difference between a successful release and

certain death. Bass caught on live bait and plastic worms often swallow the hook, reducing chances for survival. If you're fishing with release in mind, set the hook soon after the strike. Although you'll miss hooking-up a few more times, the likelihood of a deeply ingested hook is greatly reduced.

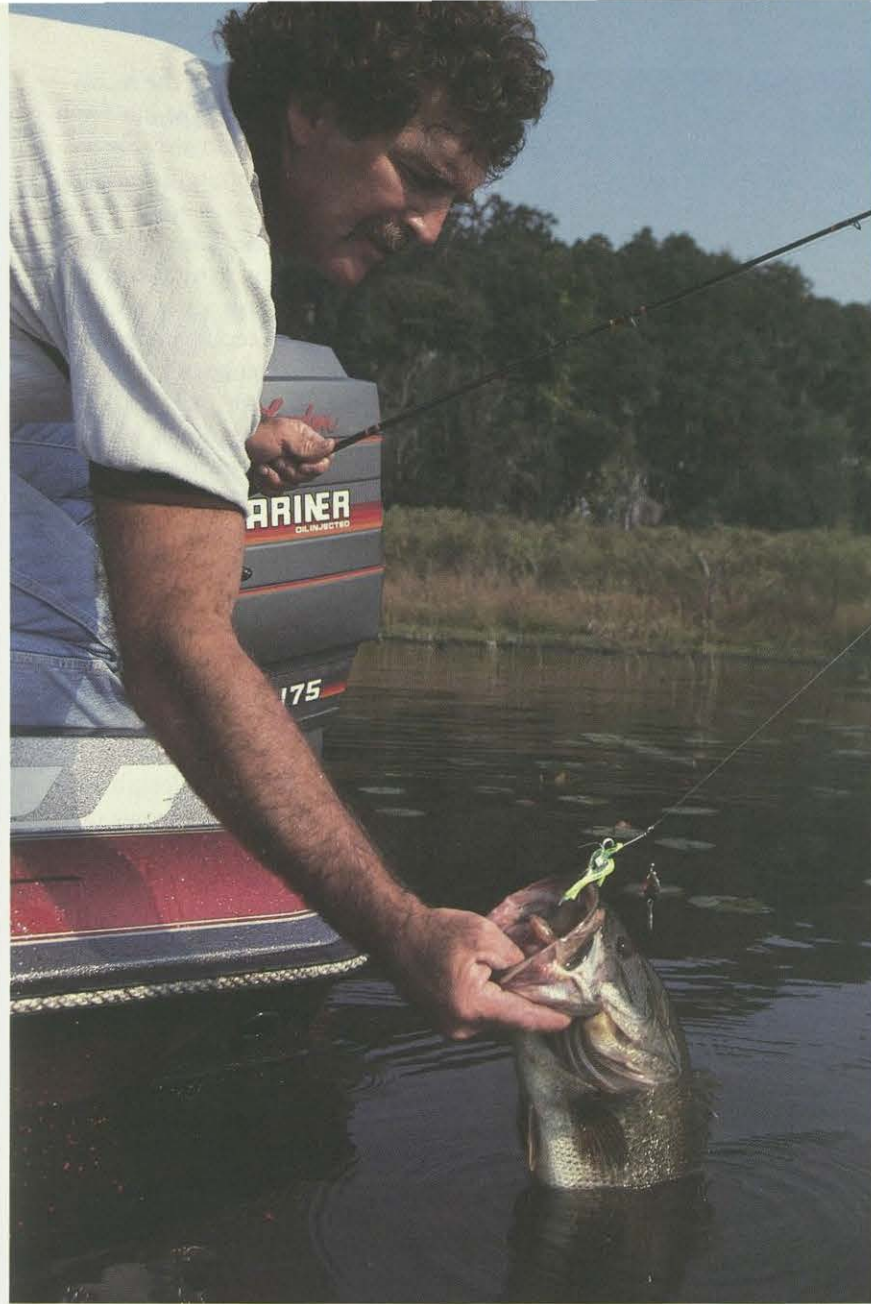
In some catch and release situations throughout the country anglers commonly use barbless hooks, both voluntarily and sometimes as required by law. Freshwater trout fishermen often use these modified hooks and so do many saltwater anglers. Under many circumstances, bass anglers can do the same by pinching down hook-barbs partially or completely with fishing pliers. Barbed hooks were invented to keep bait impaled and usually play very little part in landing fish if adequate tension is kept on the line. Obviously, hooks with little or no barbs cause less damage when entering and when removed.

For similar reasons, lures with small hooks do less harm than those with larger hooks. Single hooks are also better than trebles when survival of the fish is your main priority.

Playing and Landing

Fish that are played and landed rapidly have better chances of survival than those that fight to exhaustion. During prolonged struggles, harmful waste products concentrate in a fish's blood and may increase the time it takes for it to revive. Heavier lines and tackle work in the fish's favor by enabling the angler to land his catch quickly. Bass caught on lighter equipment may also have good chances for recovery, but might require additional assistance from the fisherman to make sure they swim away strongly.

Different species of fish have various tolerance levels for stress. Largemouth bass expend their energy fairly rapidly and seldom become seriously exhausted. Uninjured bass caught on any weight tackle will probably survive



PHOTOGRAPH BY TOM EVANS

when handled gently and returned quickly.

Avoid using landing nets to boat fish to be released. Bass that thrash around inside coarse or knotted nets scrape off mucus, the slimy coating that serves as their primary defense against disease. Once this barrier is broken, bacterial and fungal infections may develop that could later cause mortality even if the fish appears to swim away unharmed. Knotless nets are less abrasive, but nearly all nets can entangle exposed hooks and increase the time required to free and release the fish. If a bass becomes seriously tangled in your net, attempt to remove the hooks with your net in the water.

Some bass can be lifted over the side of the boat with the rod, while heavier fish may best be landed by grabbing the lower jaw. A firm grip on the lower jaw usually immobilizes the bass and opens the mouth for hook removal.

Handling Bass

Use good judgment when handling any fish to be released. Handle them gently and only by the lower jaw if possible. If it is necessary to grab the body, use wet hands and don't squeeze tightly. Never use a dry towel or gloves to hold a fish. Make every effort to keep the mucus coating intact. Keep

the fish wet, holding it in the water if hook removal becomes a problem. Avoid touching the sensitive gills and eyes.

Although largemouth bass are relatively tolerant of careful handling, serious stress occurs when left out of water for a prolonged period of time. When a bass leaves the water, breathing becomes impossible. Lack of oxygen for several minutes is enough to eliminate it as a candidate for successful release. Maintain a strong hold on the fish's lower jaw when handling the fish. Don't let it flop around the deck of the boat.

During summer months when air and water temperatures are high, the potential for mortality increases sharply. Anglers should exercise extra care during this time to avoid injuries to fish and expedite releases.

Hook Removal

Surprisingly few bass fishermen keep hook-removal tools accessible. The use of these simple devices can greatly assist in unhooking fish and minimizing damage. Tools include commercial "de-hookers," long-nose pliers and surgical hemostats (clamplike surgical instruments used to stop bleeding).

Use these tools whenever necessary. Never attempt to tear the hook out. Grasp the hook near the bend and apply pressure to back the hook-point out, opposite of its direction of entry. Hemostats are especially handy since they can be locked under pressure. Their fine pointed tips are particularly suited for removing smaller hooks and will conveniently clamp to your shirt or pocket flap, ready for the next fish. Pliers with sidecutters are useful for cutting line or hooks that are difficult to remove.

Deeply-hooked fish require careful attention. If hooks are inaccessible or are swallowed, the best procedure is to cut the line or the hook shank itself where possible. Attempting to dislodge a deeply imbedded hook will cause even greater damage. Most hooks that remain in fish will eventually rust away or be eroded by digestive ▷

juices. Even gut-hooked bass can often be released with a good chance of survival by cutting the line and leaving the hook undisturbed. Fish that are hooked in the gills and that bleed profusely are probably best kept for the dinner table unless this is prohibited by local regulations.

The Release

Examine your fish closely before releasing it. Limp, listless fish, those with cloudy eyes, or those whose bright red gills have faded, probably won't recover. If it can stabilize in the water and appears to swim normally, the fish will probably survive.

Not all fish will be able to swim away briskly when placed back into the water. Make sure the gills are moving and that the fish is able to maintain its balance before turning it loose. If it is slow to respond, move it back and forth gently just under the surface to force water across its gills. Be patient, it may take several minutes or longer to recover and swim away on its own.

Don't drop or throw fish back into the water. They may be further stunned, and could sink to the bottom or become entrapped in vegetation and die before recovery.

Never impale fish you intend to release on stringers. Similarly, live baskets should not be used to hold fish unless you plan to eat them later. Although some anglers routinely keep all bass in their live-wells and release them at the end of their fishing trip, this practice should be discouraged. Delaying the release only results in unnecessary stress to otherwise healthy fish and could reduce their chances for survival.

If survival is questionable, plan to keep the fish or place it in an aerated live-well and check its progress periodically. You can release the fish later in the day if it is able to resume normal swimming. Again, abide by local fishing regulations, being careful to possess only fish of legal size and species.

Keeping Trophy Bass

There are several conflicting attitudes regarding the practice of

keeping trophy-sized bass. Bass that live long enough in Florida to attain trophy size (generally defined as eight pounds and larger) are probably 8 to 12 years old and will survive only a few more years before dying of old age. Realistically, chances of these larger fish being caught again if released are low, considering that the remainder of their life span is relatively short.

Similarly, no evidence exists that warrants concern from a genetic perspective over the harvesting of trophy-sized bass. Nearly all bass of this size are females and they have already spawned numerous times, perpetuating the gene pool that determines the biological characteristics of a species. If, in fact, the ability of largemouth bass to attain trophy sizes is transferred genetically to progeny, previous spawning has already ensured this contribution. Biologists currently believe, however, that the factors of quality habitat, good growing conditions and long term survival are primarily responsible for production of our larger bass.

Regardless, these strictly biological considerations should not deter anglers from returning trophy-sized as well as small bass. Actually, it is the release of intermediate-sized largemouth, three pounds and heavier, that will contribute most towards quality fishing in the near future. Bass this size usually take five years and longer to replace, while smaller bass are considerably more abundant and are replenished much more rapidly through natural production. If anglers concentrate heavily on harvesting only larger bass, size distribution and consequently the quality of the bass fishery is likely to deteriorate. Although Florida anglers readily return most bass 12 inches and smaller in the interest of conservation, it is more important to consider recycling intermediate-sized bass and keeping smaller ones for the table.

Largemouth bass that have survived long enough to attain trophy proportions also deserve recognition for the unique ecological role they serve in aquatic systems.

These fish are among the most sizeable and efficient of our fresh water predators and are able to consume large, often undesirable forage fishes such as adult gizzard shad. Since these larger forage species have few natural enemies, predation by larger bass is often important to keep fish populations in a desirable range of balance.

Although many of Florida's trophy-sized largemouth were once destined for the taxidermist, a growing number of fishermen now prefer to release these impressive catches. This is both a tribute to the angler and an ultimate tribute to the fish. But even when these large bass are allowed to swim away, anglers will still have memories of the experience. Also, many taxidermists can create lifelike, replica bass mounts based on the length and girth measurements of your catch. Anglers can take pride in knowing that their trophy was returned to the water unharmed while a realistic fiberglass bass serves as a reminder of the occasion.

Photographs are an even less expensive alternative. The best photographs are taken when fish have just been landed and colors are most vivid. An economical pocket-sized camera is easily carried in a tackle box, ready for instant use. Have several shots taken while holding the fish, then have your partner lean over the side of the boat and take one final photo of the fish being released.

Once your bass swims away, pat yourself on the back and try for another. Take pride in knowing that your attempts to conserve this valuable resource may contribute greatly to the future of fishing. Who knows—the bass you release today might live to be a future world record for some lucky angler. Maybe even you!

Good fishing!

Phil Chapman is a fisheries research biologist specializing in the sportfish enhancement programs in the Commission's South Region.

Summary

Common sense goes a long way toward improving survival chances of released fish. Hooking and playing a fish results in increased stress when the fish is removed from the water. Remember, the fish is out of its own environment. Put yourself in its situation. The potential for successful recycling depends largely on the care you exercise.

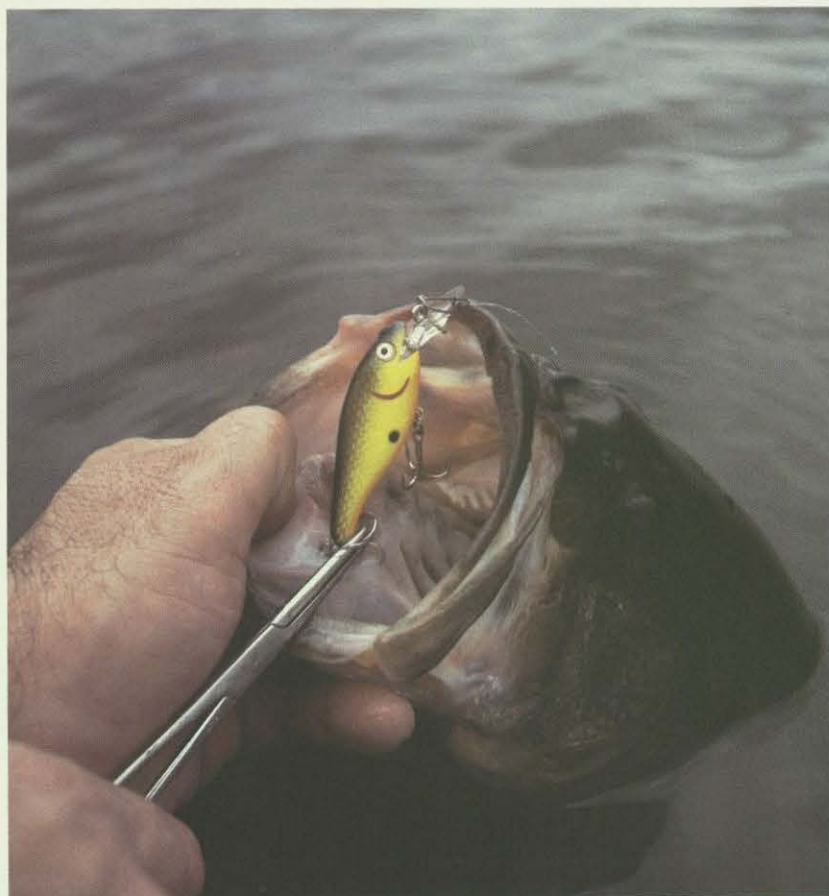
Use good judgment and practice these 10 suggestions for catch and release fishing:

1. Pinch down or remove hook barbs. Use single hooks or small treble hooks to enhance survival rates.
2. When a fish takes your bait, strike quickly to avoid a deeply ingested hook.
3. Play and land fish rapidly to minimize exhaustion and stress.
4. Avoid the use of landing nets that can scrape the protective mucus layer off the bass and increase the likelihood of infection or disease.
5. Hold bass with a firm grip on the lower jaw whenever possible. Always use wet hands and never use a dry towel or gloves to handle fish.
6. Use "de-hooking" tools to back hooks out. Avoid touching sensitive eyes and gills when unhooking fish.
7. Never attempt to tear a hook out. Cut the line when your hook is deeply imbedded or difficult to remove quickly.
8. Return the fish to the water as quickly as possible.
9. Avoid the use of stringers, fish baskets, or the use of live-wells for an extended period of time.
10. Revive fish when necessary and release them gently. Be patient, exhausted fish may take several minutes to recover—it's worth the extra effort. ❶



PHOTOGRAPH BY PHIL CHAPMAN

Hook-removal tools can greatly assist in unhooking fish and in minimizing damage. Never attempt to tear a hook out.



PHOTOGRAPH BY PHIL CHAPMAN

Surgical hemostats are especially handy since they can be locked under pressure.

Fishing's For The Birds

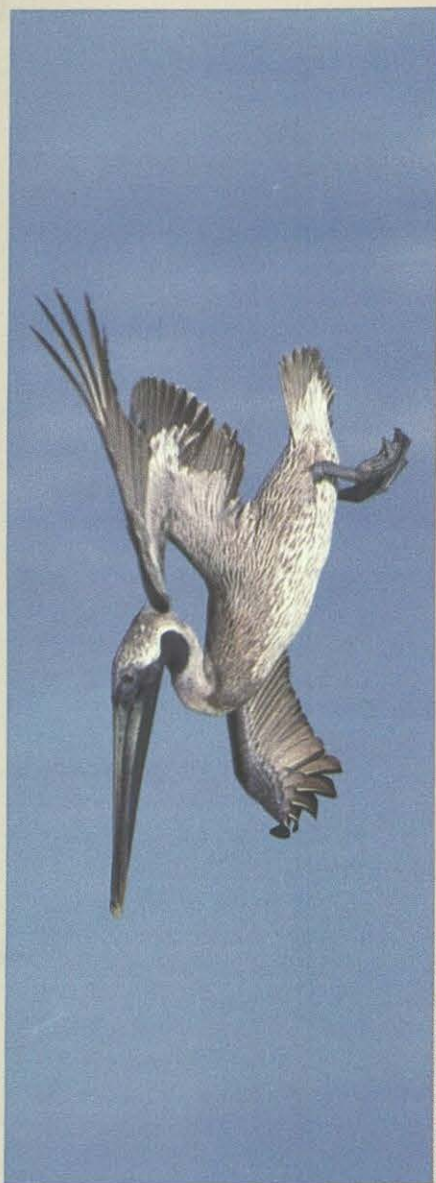
By Kathleen Brown

We humans often think about fishing in terms of rods, reels, lures, bait and hooks. We establish elaborate and sometimes masochistic rituals that involve arising at absurd hours, wrestling with an outboard engine in pre-dawn darkness, paddling through thick weeds and grasses, and getting damp, chilled and downright surly before that first cup of coffee. We pursue these cold-blooded, simple-minded, lower-order critters with an obsession bordering on the psychotic. We measure our success in inches, pounds, or a full string, and often don't even get to enjoy the delectable fruit of our labors. For other members of the animal kingdom, however, success is measured by a full belly and the effort is just a typical day's work. The fishing techniques of herons, pelicans, kingfishers, terns and other water birds are studies in stealth, patience, perseverance, and determination.

It's easy to spot fishing terns; the steady hover of their white wings high above the shallow-water waves immediately attracts attention. Specialized adaptations of the wing bones and muscles allow for the subtle gymnastics necessary to maintain flight with no forward speed. A tern singles out a prospective meal and, with a flicker of feathers, plunges into the water below like a falling stone. It then bobs to the surface to either fly off with its hard-earned morsel or to try again. Like many marine birds, it nests in dense, noisy colonies that can be supported by the large schools of small fish living close to shore.

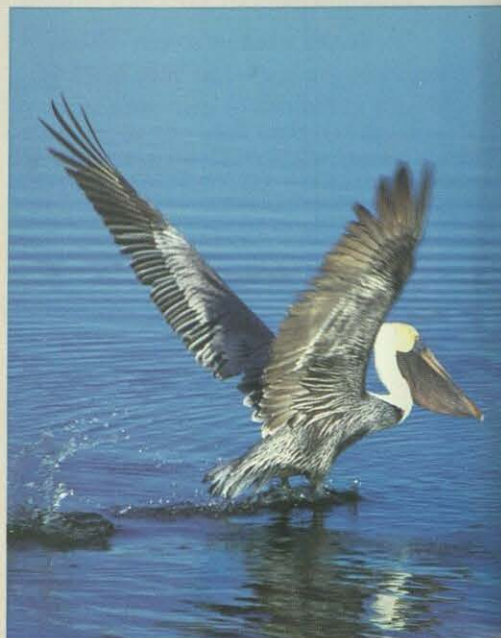
Another marine fish-eater with an on-the-wing style but considerably less finesse is the brown pelican. It wields the avian equivalent of a "cast-net" under its bill and follows a much more "shotgun" strategy than the sharpshooter tern. Often seen flying in precision formation over Florida's coastal beaches and wetlands, a squadron of feeding brown pelicans is the picture of organized chaos. Wheeling, climbing and dropping, they create a confusing disturbance to schooling fish, then they plunge into the school with mouths open to engulf whatever is in the way. The brown pelican often takes advantage of late afternoon and evening sunlight to hunt, when the low light angle enables it to see surface-schooling fish more easily. This form of fishing takes its toll, however, as the impact of thousands of dives over the bird's lifespan eventually weakens and cripples it. Eyes are especially sensitive to impact, and it's not unusual to see older birds with rapidly failing eyesight. The brown pelican's near-shore fishing habits also make it susceptible to human-induced injuries, such as monofilament entanglement and the ingestion of fishing hooks, lures and trash.

A close relative, the white pelican, uses its "cast-net" in a very different way. These birds fish on foot in the shallows, forming a tight, well-organized, feathered phalanx. With wings outstretched to shade the water, creating diffused light for better viewing, the flock advances slowly like a tightening noose around a school of fish, then scoops up the mass of struggling fish to dine leisurely on the entrapped prey.



PHOTOGRAPH BY LYNN STONE

Brown Pelicans



PHOTOGRAPH BY CHARLIE HEIDECKER

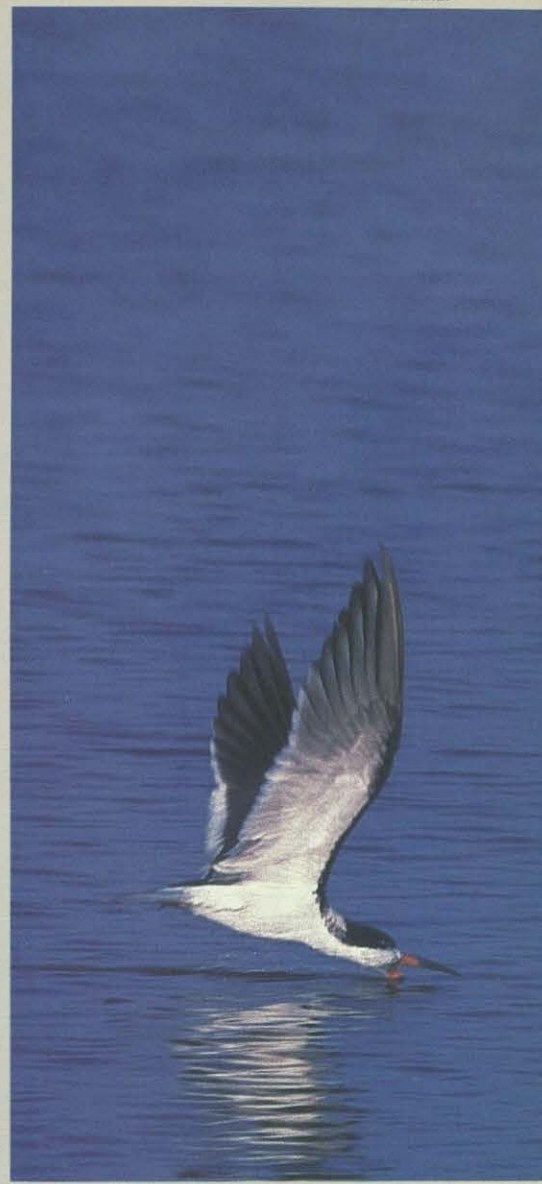
Your concept of dining leisurely probably differs from a pelican's. Most fishing birds eat their catch whole, and therefore must swallow a fish headfirst to prevent sharp spines and scales from snagging delicate throat tissue. The fish must be positioned properly; otherwise it could get stuck, suffocating the bird, or one of the fin spines could puncture the esophagus or windpipe on its way down. Pelicans don't swallow all of the water scooped up with fish, but allow it to drain from the edges of the bill before positioning and swallowing the still-wriggling prey. Many meals suffer the added insult of several flips, tosses and careful positioning to be sure they go down just right.

Heron and related wading birds stalk their prey from the ground, relying on excellent vision to see prey below the water's surface and stealth to sneak up on small fish, frogs, snakes, or aquatic insects. A wading bird stalks prey like a predatory cat, remaining almost motionless as it inches closer and closer to its intended victim. By blending into the background of overhanging trees and vegetation, this long, leggy bird is likely to be mistaken for branches or grass stems—until it's too late. It pounces, then either eats or keeps on fishing. Night herons also take

advantage of low light angles at dawn and dusk to see their quarry better, and are often found hunting at the water's edge at these times.

Some water birds, such as mergansers and cormorants, catch their prey while "flying" underwater. Using their webbed feet to propel themselves, they often dive under the surface for several minutes at a time in pursuit of their slippery dinner. The hooked bill of the cormorant and the serrated bill of the merganser are specially adapted to catch and hold fish. A close relative of the cormorant, very commonly seen in Florida, is the anhinga. Also called a snakebird or water turkey, the anhinga swims low in the water with only its neck exposed. This bird sports a long, sharp bill for spearing fish, which it pursues under the surface. Unlike many other water birds, the anhinga lacks adequate oil glands to waterproof its feathers and must spend time drying its wings after a dive before it can fly for any distance. The sight of this bird, wings outstretched basking in the sun, is characteristic of Florida's freshwater areas.

The indisputable angler champion of the bird world is the osprey. Also called the fish eagle, this large, long-winged hawk has evolved some very specific adaptations for catching ▷



Black Skimmer

PHOTOGRAPHS BY CHARLIE HEIDECKER



Reddish Egret, White Phase



Double-crested Cormorant

fish. The curved, sharp talons, feather-bare legs, and extremely rough, spiny soles of the feet are all essential to holding on to its catch. This bird's handsome markings and conspicuous nestbuilding render it particularly easy to spot and watch. Ospreys generally go after fish in shallow water by diving from the air. Unlike terns, they are less likely to hover in one place, but prefer to look for potential prey from a convenient perch. Because of their strict preference for fish, ospreys were seriously threatened in the 1960s by the use of DDT and other pesticides that entered bodies of water. Fortunately, they have made a dramatic comeback and are now commonly seen in Florida.

Interestingly enough, one of the chief competitors of the osprey is the bald eagle. Also principally a fish-eater, the national bird prefers to steal meals from the osprey and scavenge dead fish from the shore or

from under the osprey's nest. Because of its preference for fish, the eagle neared extinction when DDT was in common use. Eagles will also scavenge for other carrion, though they occasionally hunt living prey. The densest populations of these birds occur in Florida and Alaska, and they have become a nuisance at garbage dumps in the latter. Still perilously threatened, the bald eagle enjoys some of the most comprehensive and specific protection legislation ever enacted to save a species.

The skimmer is the only avian angler to fly across the water to scoop up prey. By flying just above the surface near the shoreline, it "skims" the water by dragging its long lower bill through the breaking waves. When it contacts something that feels like food, it simply closes its mouth to pick up the morsel. Its specially adapted lower jaw is considerably longer than the upper

part, a distinctive characteristic unique to the skimmer. Like many marine birds, the skimmer's coloration of ventral white and dorsal black conceals it to prey looking up against the bright sky, or to predators looking down against a dark sea.

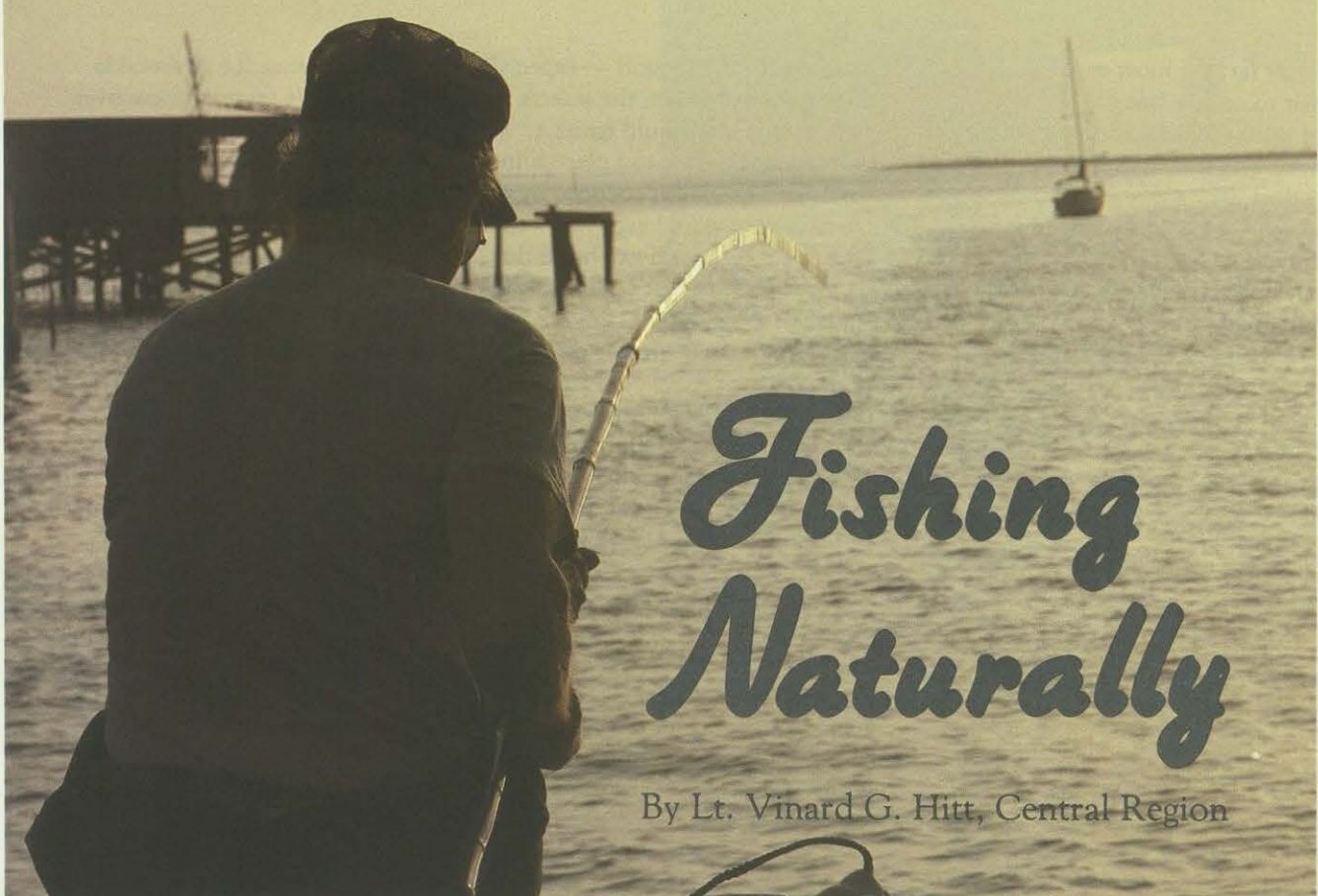
Even though I can't afford the time to fish that I would like, I can still share in the thrill of the catch with my bird friends. All I need to do is get comfortable down at my favorite water hole or beach and watch. The grace, agility and skill these feathered masters of the water display is truly a sight to behold, and enough to put us weekend anglers to shame. ①

Kathleen Brown is the curator of education at the Museum of Florida History in Tallahassee.



Osprey

PHOTOGRAPH BY LYNN STONE



Fishing Naturally

By Lt. Vinard G. Hitt, Central Region

PHOTOGRAPH BY TOM EVANS

I never had a chance. My father was partially responsible, my grandfather was just as guilty, but because of them I was destined to become hooked on natural baits. My elders were confirmed bream fishermen. All they needed for an enjoyable outing was a limber cane pole, a few B B split shot, some black braided line, some Number 10 longshank Carlisle hooks, a bucket of bait and time to go fishing. I tagged along with them on many trips and was indoctrinated in the ways of canepole fishing for bream at an early age.

"Bream" is the collective term often applied to a variety of sunfish, including redbreast, bluegill, redear, spotted sunfish, and warmouth. We usually spoke of bream fishing or talked of catching a mess of bream. When speaking of individual species, we were less likely to use the accepted common names and more likely to speak of redbellies, government bream, shellcrackers, stumpknockers or goggleyes.

There are lots of confirmed bream fishermen though, and lots of good ones too. The thing that may have

set us apart was some of the unusual baits we used. Bait shops were not very accessible during the late fifties and early sixties when I was learning about bream fishing, so we had to improvise and gather our own.

Whatever bait that fish would bite, we used. No matter how terribly it smelled, or how slimy the skin, or how painfully it would sting us, we used it.

We used earthworms of course, but we also used various kinds of caterpillars, larval wasps and yellow jackets, beetle larvae, small salamanders and even an occasional roach. Heck, some of our bait-gathering experiences were as exciting as any fishing trip I've ever been on.

Most often, we used earthworms. As far as we were concerned, there were only two kinds—nightcrawlers and wigglers. Nightcrawlers were four to six inches long and lived just beneath the leaf litter in low-lying, moist, shaded areas. We could find them most easily after a heavy rain. These soft-bodied worms were not our favorite because they excreted a sticky, brown substance and didn't

seem to be as attractive to the fish as the wigglers. Wigglers were also partial to moist, shady areas but they lived a bit deeper in the ground, about half-a-foot beneath the surface. They were three to five inches long and firmer in body. They wiggled like crazy and we had to dig them up with a four-tined garden tool we called a potato rake.

Another one of my favorite baits was a caterpillar that occurred seasonally on the underside of the broad green leaves of the catalpa tree. The catalpa worms were larval forms of the catalpa sphinx moth and were commonly found in the early fall. They were distinctively yellow and black, had a velvety appearance, and usually grew to about two inches in length. Many folks in our area planted catalpa trees not only for shade but also a ready supply of bait.

There was also a fuzzy, cream-colored caterpillar that occurred on streamside sycamore trees during the fall. We called them "woolly worms" and caught a lot of fish with this larval form of the sycamore tiger moth. ▷

By far, the most exciting type of bait to collect was the larvae of yellow jackets and wasps. We were very inventive about trying to collect them without getting badly stung. Yellow jackets live in the ground so finding and digging them out was a challenging adventure.

My grandfather had an interesting way of finding the underground nests. Yellow jackets seem to prefer wooded hillsides, so my grandfather would find a likely looking hillside and hang a small piece of raw fish on a low-lying limb. For some reason, the small black and yellow wasps were attracted to the raw fish. (Have you ever noticed what pests yellow jackets can be when you are cleaning fish?) The yellow jackets would take a small piece of fish in their mandibles and fly straight to their nests. Because of the weight of the piece of fish, the yellow jackets could not fly very fast and we could follow them a short distance before we lost them. Tracking them to their nest was just a matter of moving the fish in the direction of the insects' flight until we could see them entering their nest hole.

The exciting part of using yellow jacket larvae for bait was getting

them out of the ground — especially during daylight when the insects were active. We would ignite a railroad signal flare and place it in the hole. The gases produced by the burning flare would asphyxiate the adult insects but did not harm the larvae. Then the nest could be dug from the ground.

If this was done during daylight hours, one person would ignite the flare, stick it in the entrance hole and dig up the nest while another person would vigorously wield a leafy branch to ward off the returning yellow jackets as they rallied to protect their nest. Getting stung once or twice was to be expected. Of course, if we waited until dark, all the insects would be inside the underground nest and no one would get stung.

We also used the larvae of paper wasps on our fishing expeditions. With a long pole we dislodged the nests from the undersides of barn roofs and chicken coops as well as the soffits of residential houses. There was one species of paper wasp that liked to attach its nests to low-hanging willow limbs just above the river's surface. We called them "red river wasps" because of their color

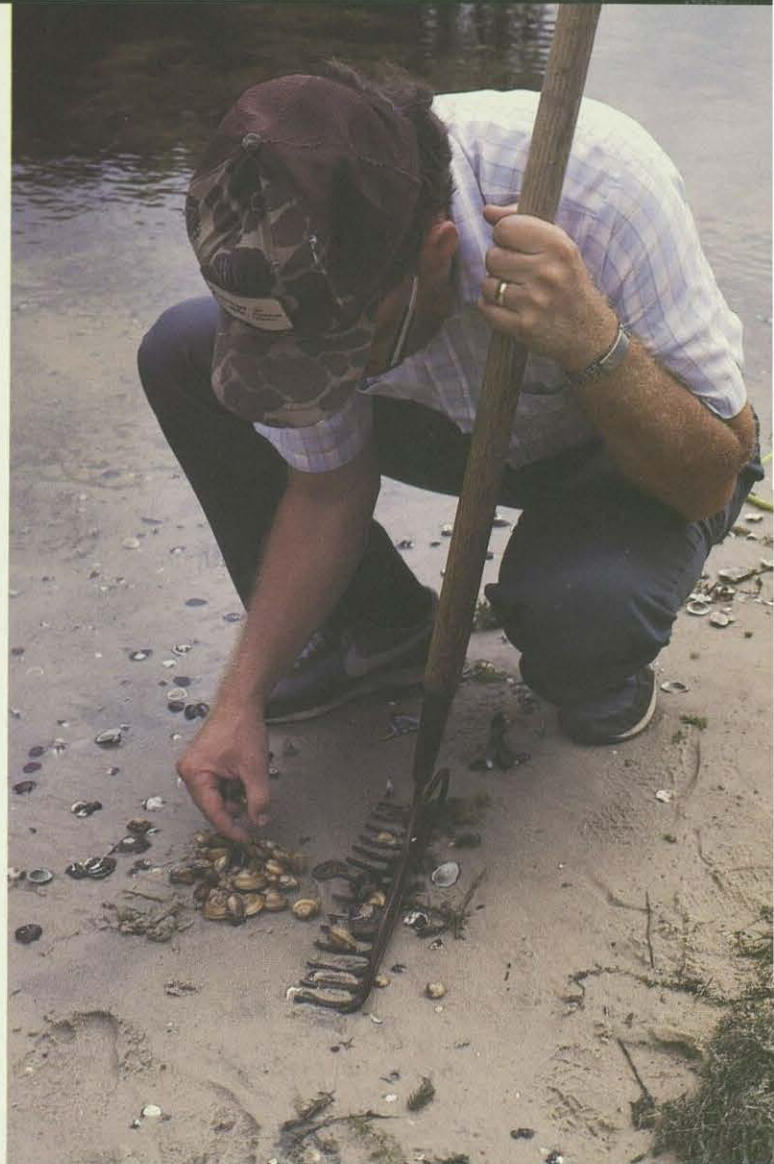
and preference for streamside willows. We favored these over other varieties because of their larger size. Some of the nests would approach the size of saucers and contain several hundred larvae. It was tricky to collect these insects because we generally had to do so from a boat. We would wrap a kerosene-soaked rag around a long pole, ignite it and place it beneath the downward facing nest. The flame would singe the wings from the adult wasps before they could fly away. We would extinguish the blaze by dunking the flaming rag beneath the water's surface and collect the nest as the wingless adults floated away downstream.

Another readily available source of bait was beetle larvae, which we called "grubworms" or "sawyers." Grubworms were round, white larval forms with biting mouths and several short legs located near the head. They could be found in rotting logs and stumps. Sawyers were similar to grubworms but were more flattened in appearance and were found exclusively under the bark of recently downed pine trees. These were larval forms of some kind of pine borer and got their

PHOTOGRAPH BY LT. VINARD HITT



PHOTOGRAPHS BY LT. VINARD HITT



name from the rasping (sawing) sound they made as they chewed their way along beneath the bark.

Warmouth, or "goggleyes" as we nicknamed them, couldn't resist what my father called "spring lizards." Spring lizards are small light brown salamanders that live under rocks and rotted logs in very wet areas along small streams. There were many small streams that emptied into the river where we fished. Also, there were lots of hillside seeps that drained into the small creeks where these salamanders were often found. These seeps, known as springs, may be the reason for the term "spring lizard."

Since I've grown older and traveled about, I've learned that there are lots of folks who still love

to use natural baits. Wherever I go, there seem to be some local favorites.

I learned to use crayfish for warmouth in the Okefenokee Swamp and I used small caterpillars that we found in the stems of spatterdock (yellow pond water lilies) along the banks of the Santa Fe River. The local folks called these caterpillars "bonnet worms" and the redbellies loved them. I learned to use the small, transparent grass shrimp for bluegill and shellcracker at Orange Lake and I've learned to use bits of clam and freshwater mussel for redbellies and stumpknockers in the Oklawaha River.

I seined crayfish from knee-deep water in roadside ditches, and checked stalks of the riverine

spatterdock for the telltale bore holes of the bonnet worms. I caught grass shrimp easily with a cast net from the vast mats of submerged vegetation in Orange Lake. Mussels and clams were dredged from the bottom of the Oklawaha river with a long-handled rake.

I've also used all sorts of manufactured tackle and artificial baits to catch bream. But I think it's more fun to gather your own bait and battle hand-sized bream with a long, limber cane pole. It's less expensive, too. Given the choice, I'll keep on fishing naturally. In fact, I've just heard of folks using some sort of caterpillar that's found on oak trees in the fall. They call them "oak dikes." I've got to check it out.



A Way With Worms

By Dick Dale

A while ago an Associated Press news story called attention to a north Florida contest in a little town called Caryville. The headline read, "Worm Fiddling Event Highly Competitive." The competition centered around a method of gathering fish bait by vibrating the ground and making king-sized earthworms rush to the surface in reckless abandon. Sadly, the story also said it was more of a novelty today than anything else—which snapped me back twenty years or so to another time in Tallahassee.

I was working in the Capitol as a reporter for radio and television and I lived on the Blountstown Road. My neighbors were A.J. and Cathleen Burns. When it comes to worms, they were experts. In their backyard there were catalpa trees grown just for the annual infestation of the catalpa worm, a fish bait of the first order and one that drew top money. They also fetched earthworms in the manner of the big day at Caryville.

They didn't use the term "worm fiddling" but something more in tune with things: *grunting worms*. The grunting noises brought visions of a sore-throated bull frog or an angry alligator.

Cathleen described the whole activity this way: "You get a hardwood stob, an ax handle is good, and drive it into the ground until it is about a foot high. Then you take a piece of metal and 'saw' it across the top end of the stob, flatwise. A piece of an old car frame does just fine.

"The stob vibrates and the worms come up out of the ground like they are aggravated. The thing is that you have to grab them fast! A family could gather lots of worms in an hour."

Naturally, being a smart city

slicker, I said, "Show me!" No Cracker gal was going to pull my leg. No siree!

The lady left my trailer and marched to her place. In a few minutes she came back with a stob, a piece of metal and A.J. They set things in action right off. The stob went down and the grunting began. Almost immediately the wigglers were climbing over my shoes. I dove for the trailer and brought out my tape recorder and camera. I didn't quite believe what I had seen, but I knew a good story for radio and print when I saw one. I can still hear the "Grrump, grump!"

A.J. and Cathleen told me, too, that a lot of North Florida families lived better and some educated their kids with the money they made grunting worms. Gathering buckets

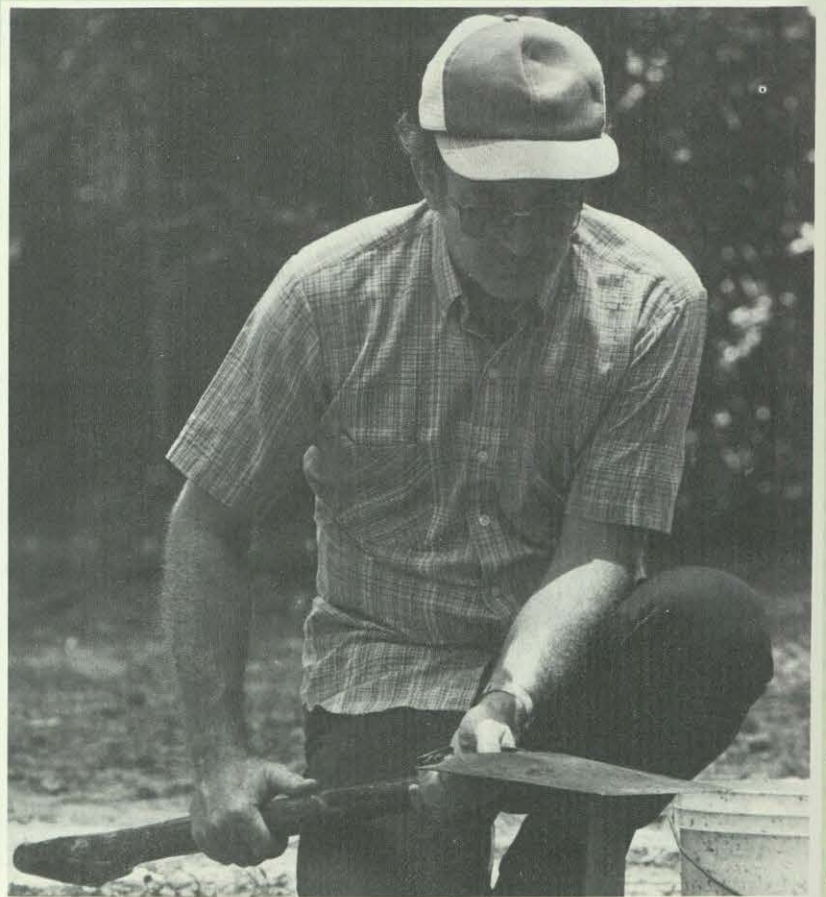
full of the fattest, longest, fish catchers around brought welcome cash from the sportsmen.

"I believe the Indians knew how to do it," A.J. said. "It got passed on to the white man somewhere way back. Everyone around here knows about it."

There was one hitch, they said. You could "aggravate" something other than worms. One boy, intent on his grunting, didn't look up for a while and when he did a big old rattler was giving him the eye from about a foot away.

"That Son slithered backward on the grass, got to his feet and I think he's still running," Cathleen said, eyes shining.

You just can't believe everything a Cracker says! 🐍



PHOTOGRAPH BY JOHN WATERS JR.

1989-90 Duck and Turkey Stamp Winners



Blue-winged Teals by J. Bryon Test



Wild Turkeys by Joe Hutto

By Mary Tebo

Imagine painting a detailed portrait of a native Florida bird in its natural setting on a piece of canvas no bigger than 6 ½ x 9 inches. Not only must your subject be anatomically correct in shape and plumage but your composition must be innovative, original, and above all, distinct. The image must be clear enough to be recognizable when reduced to an even smaller size—a space approximately 1 ⅞ inches wide and 1 ⅝ inches high!

Each year competitors in Florida's waterfowl and turkey stamp contests tackle the challenge of creating these diminutive works of art—paintings small in proportion but giant in the skill and talent they represent. This unusual genre of wildlife art, launched in 1934 with the minting of the first federal duck stamp, has grown with the number of states that have initiated their own conservation stamp programs. Florida's Game and Freshwater Fish Commission sponsored competitions for the first Florida Waterfowl Stamp in 1979 and the first Florida Turkey Stamp in 1987. Proceeds from the sale of these stamps, nearly \$200,000 a year, directly benefit waterfowl and turkey populations in Florida.

"I like the small format," said J. Bryon Test of Guyton, Oklahoma, whose acrylic rendition of blue-winged teal was selected as the 1989-90 Florida Waterfowl Stamp. "I prefer to paint my subjects smaller rather than larger than life. This way I don't have to expand them." Test is obviously proficient in this style, having been a finalist last year in the federal duck stamp contest and a runner-up in the Ohio and Alaska waterfowl stamp contests. He chose a pair of blue-winged teal as his subjects because this species had never been featured on Florida's waterfowl stamp and because their taxonomic cousins, green-winged teal, appeared on the first Florida waterfowl stamp ten years ago.

Joe Hutto, winner of the Florida Turkey Stamp contest, had never entered a stamp competition before. "At first I felt limited by the small space," said the Tallahassee-based artist. "But as I worked I realized that painting on this scale required just as much detail and offered just as many possibilities as a work three times this size."

Prints of this year's winning art are available directly from the artists. Those interested in the waterfowl stamp art may contact J. Bryon Test; 1416 Maple Avenue; Guyton, Oklahoma 73942. Turkey stamp art enthusiasts may contact Joe Hutto; 1307 Mountbatten Road; Tallahassee, Florida 32301.

RADIO TELEMETRY

Window on the Wildlife World

By David S. Maehr

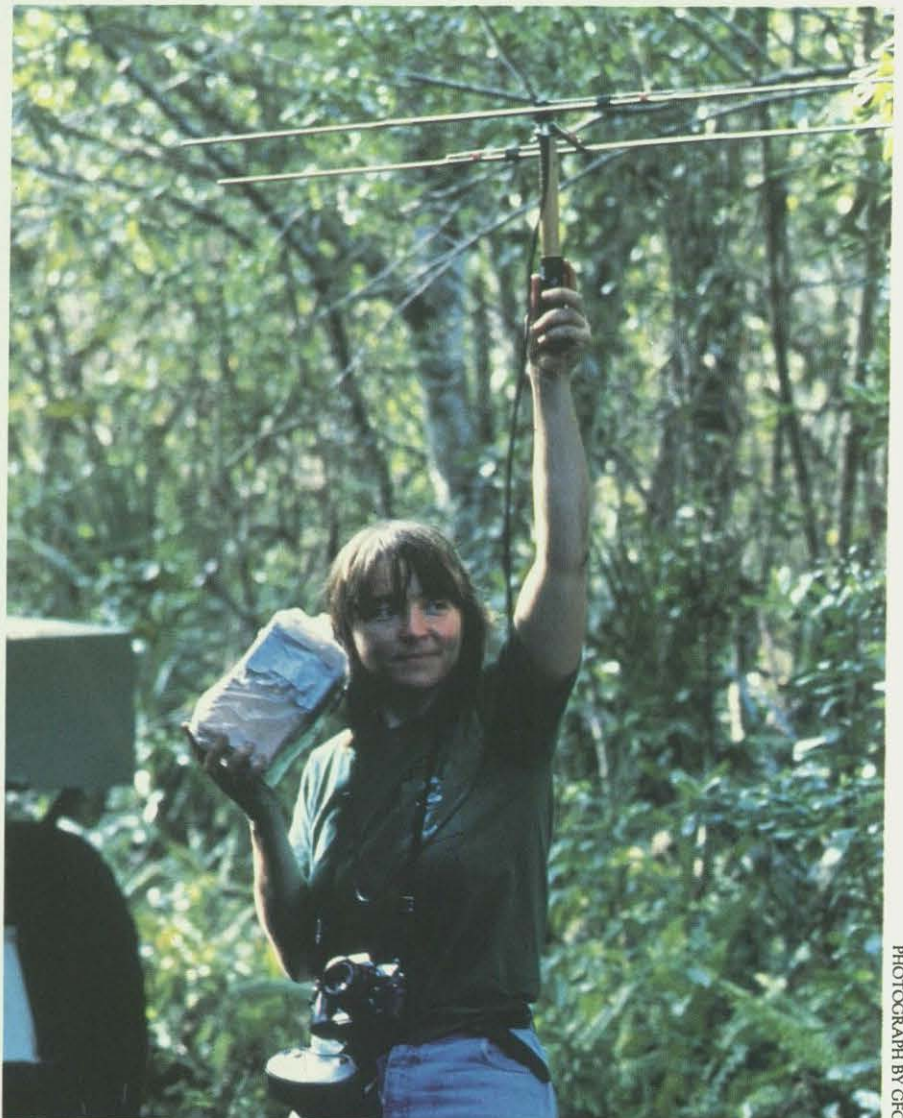
One of the most important aspects of wildlife ecology is understanding how an animal interacts with its environment. Through the first half of this century, wildlife biologists depended mostly upon deciphering the "sign" animals left behind during various activities to explain species' distribution and behavior. For example, from footprints an adept observer can determine a species' identity, sex, and sometimes its age. Tracks can also be a record of interactions among several animals. Parallel pug marks of various sizes of bears show that a roving female and her litter have recently passed. A trail of running deer tracks superimposed with large cat tracks that turns into a confusion of skid and scuff marks may indicate the presence of a well-fed panther nearby. Tiny imprints of a woodrat that disappear in feathery broom marks tell the story of a successful owl's hunt. The examples are virtually endless.

Although sign and occasional glimpses of secretive wildlife can provide valuable insights, these observations can tell only part of the story of animals' lives. In the early 1960s, following advances in post-war radio technology, a new tool became available for wildlife studies. The radio collar, first pioneered by scientists such as John and Frank Craighead, opened a new window into wildlife ecology. For the first time, researchers were capable of locating study animals at any time regardless of terrain or their subjects' behavior. The early collars were bulky, heavy packages that only large animals could wear. Accordingly, grizzly bears and other

large mammals were the first to surrender their secrets to wildlife scientists. Now, however, after three decades of continued electronic advancement, compact radios enable scientists to make detailed movement studies of even the smallest rodents and birds. Not only can these radios (weighing as little as one-tenth of an ounce) indicate their hosts' whereabouts, but with special

attachments they can detect body temperature, heart rate and activity rates.

Today, radio telemetry is revealing information vital to managing and conserving a wide variety of wildlife species throughout the world: pandas, leopards, wolverines, eagles, bats, and whales, to name a few. Radio telemetry in Florida has allowed a



PHOTOGRAPH BY GFC

better understanding of sandhill cranes, woodstorks, wood ducks, wild hogs, white-tailed deer, gray foxes, bobcats, raccoons, opossums, gopher tortoises, alligators, black bears, Florida panthers, and even cotton mice. A biologist can now capture a study animal a single time, attach a radio transmitter, and then locate it again hundreds of times throughout the life of the transmitter. Researchers collect radio signals on foot, in vehicles, from aircraft or remote tower systems. Satellite technology has even been coupled with computers and telemetry systems for studying Florida manatees. Before the advent of radio collars, researchers could only study animal movements through repeated captures of marked individuals. Though this work yielded some information on range and distribution, it gave little insight into habitat use and behavior.

Biologists at Archbold Biological Station in Highlands County used transmitters weighing one-tenth of an ounce to track three mouse species over home ranges measured in square feet. Although battery life and signal strength are reduced in such miniature systems, small home ranges and high population turnover (mortality) reduce the need for transmitter power. In contrast, collars weighing one to two pounds are used to study Florida bears, deer and panthers. Signal strength and transmitter life (about two years) are important for these species because of their huge home ranges (up to 500 square miles for panthers) and relatively long life spans. Researchers also have the option of building switches into the collars that can monitor activity changes and death. Break-away and expandable collars are used for young, quickly-growing animals and for those that will not be captured and handled more than once. Wide-ranging animals are usually tracked with aircraft, allowing for quick and accurate location throughout a large area.

Data collected in telemetry studies provide details on patterns of habitat use, population density,

social interaction, movements, reproduction and mortality, all important considerations in managing wildlife. For example, researchers know that the Florida panther is extremely sensitive to habitat fragmentation and intense human disturbance. Use of telemetry is well-suited for study of this species because of its large size and extensive movement. Knowledge of panther habitat use and movement has been helpful in planning land acquisition and large-scale highway developments. Such information was used to determine the appropriate locations for wildlife underpasses that are being constructed on Interstate 75 in southwest Florida. Movement data have also influenced recommendations for reducing impacts of citrus and mineral development on this endangered species.

Telemetry research on panthers is currently answering important biological questions concerning litter size, juvenile mortality, age at first reproduction, and dispersal patterns. Radio collars have also allowed researchers to recover and rehabilitate injured panthers. Adult female Number 9, injured by gunshot, and adult male Number 20, hit by a three-quarter ton

pickup, both recovered in the Metro Miami Zoo and went on to produce offspring after their return to the wild. They probably would have perished if they had not been subjects of telemetry research. Biologists hope their work with panthers will allow them to track their subjects' fates in a shrinking and ever-changing environment.

While the conservation needs of many animals are not as pressing as those of panthers, scientists require more detailed natural history information for all species. In an age when advanced technology has enabled humans to dominate vast areas that once supported wildlife, it is fitting that technology should also be a key element in understanding and conserving wildlife. Radio telemetry provides a valuable window on wildlife that we can use to manage and preserve a natural Florida.

David S. Maehr is a biologist researching the Florida panther and supervisor of the Commission's panther studies in south Florida. Ongoing research includes telemetry studies of the panther and determination of its prey base on public and private lands of south Florida, especially Collier County.



PHOTOGRAPH BY DARRELL LAW

What Have You Done For Wildlife Lately?

By Pat Millsap

What have you done for wildlife lately? Cape Coral citizens can answer this question enthusiastically: they're taking positive action to preserve their burrowing owl population.

The Cape Coral owl project began to take shape two years ago when the Commission's nongame biologist for the South Region, Brian Millsap, noticed an increasing number of phone calls reporting destruction of burrowing owl nests in Cape Coral. After a little investigation, he discovered that Cape Coral is home to one of Florida's largest burrowing owl populations. Listed as a species of special concern (a species likely to become threatened or endangered without adequate management), burrowing owls are protected under state and federal laws. And Cape Coral's burrowing owls needed help.

Historically, Cape Coral was a large, forested wetland. In the 1950s a corporation dredged and filled over 100 square miles for future development. In the process, they evicted native wildlife but created prairie-like habitat perfect for burrowing owls. The owls were quick to take advantage of this new area. Unfortunately, life in Cape Coral has become increasingly difficult for these owls as development has consumed the empty lots they need for nesting sites. Cats, dogs, cars, and careless people have also taken their toll on these pint-sized animals.

The situation in Cape Coral reflects the burrowing owl's predicament throughout Florida. Burrowing owls formerly nested in Florida's drier prairies, but many of

these areas were converted to pastures and citrus groves. At the same time native prairies were disappearing, developers were creating artificial ones in rapidly growing coastal areas. Thus burrowing owls displaced by agriculture moved to these urban prairies, where the largest known populations now occur.

To manage and protect Florida's burrowing owls, biologists needed more information on factors affecting urban nesting populations.

Fortunately, ornithologist Ted Wesemann had studied a portion of Cape Coral's burrowing owls from 1984 to 1986 as he worked on a master's degree from Appalachian State University. Using Wesemann's thesis as a base of information, Commission biologists selected Cape Coral as a burrowing owl study site in 1987. The primary goal of the owl study was to monitor population trends over a designated area in Cape Coral for a period of five years. This objective sounded



PHOTOGRAPH BY CHARLIE HEIDECCKER

simple at the time. However, combing 12 square miles for birds that nest underground and repeatedly visiting each nest to count young requires a great deal of time.

Luckily, 26 caring and competent volunteers of the Audubon Society of Southwest Florida, led by Cindy Bear, then the chapter's president, answered a call for help. These dedicated individuals not only endured a four-hour field training exercise but also contributed endless hours of their own time by carefully collecting data on four to 12 nests each. The information gleaned from these observations is invaluable. With two years of data, many methods of saving Cape Coral's burrowing owls are already evident.

From the initial survey in 1987, it was very obvious that the citizens of Cape Coral value their owls. Many people have erected perches and "Do Not Disturb" signs near their feathered neighbors' burrows. The volunteers also reported being questioned by people rushing out to defend "their owls" from intruders. With strong concern for owls, Cape Coral citizens were hungry for

information on their treasured birds and advice on what they could do to help.

Once again, the tides were in the Commission's favor, and the Cape's leading burrowing owl protector, Cindy Bear, offered her help. Bear is not only active with Audubon but also works for Lee County School's environmental education program. At the next county environmental education meeting she talked about burrowing owls and the need for help. A group of interested teachers jumped right in and the Burrowing Owl Education Committee was formed.

During the first year, 1987, the committee put together a packet of information on owls and distributed it to every school in Cape Coral and North Fort Myers. A group of Cape Coral high school students produced a three-minute video on burrowing owls that was broadcast to all the area schools. To complement the broadcast, each school distributed a burrowing owl fact sheet to all students. John Porta, industrial arts teacher at Cape Coral High School, designed an owl perch for his shop class to produce. Other

teachers applied their own skills and produced school exhibits, art contests and nature studies.

This was only the beginning. In 1988, the Burrowing Owl Education Committee recruited teachers at Pelican Elementary, a school located in the center of the owl study area that has four owl burrows of its own. Sue Tracy's fourth-grade class produced a play on the life of a burrowing owl emphasizing the problems owls face as well as actions people can take to help. Performing the play in front of Pelican Elementary's entire student body—over 2,000 children—the class used this opportunity to launch the Owl Watchers League (O.W.L.). After the play, teachers Lyn Brown, Cindy Grumly and Sharon Linstrom made sure each student received an O.W.L. membership card. It is an O.W.L. member's duty to help protect burrowing owls for the benefit of all and to share this concern with friends and family. At the end of the school year, Pelican Elementary's O.W.L. members presented each of their four burrowing owl pairs with a new, name-engraved perch. ▷

PHOTOGRAPH BY BRIAN MILLSAP



PHOTOGRAPH BY CHARLIE HEIDECKER



PHOTOGRAPH BY BRIAN MILLSAP



Cape Coral citizens have spent an amazing amount of time and energy to improve the quality of life for burrowing owls, and ultimately for themselves. Individuals like Cindy Bear have donated hundreds of hours to this cause. Schools like Cape Coral High and Pelican Elementary have shown their dedication to education by involving their students with the community.

As a new year begins, life for Cape Coral's burrowing owls will be a little easier. The citizens of Cape Coral are seeing to that. Their hard work has attracted the attention of the City Council and the City Planners Office, which are now considering additional measures for protecting Cape Coral's most unique resource. Who knows? Maybe the city's future logo will feature the famous burrowing owl!

Two little owls full of fear,
Two little owls see children near.
Two little owls think we're a scare,
But two little owls don't know
WE CARE!

April Fuller
4th Grade

Pelican Elementary School

For a free color brochure on Florida's burrowing owl write to the Game and Fresh Water Fish Commission office nearest you.

**WHAT HAVE YOU DONE FOR
WILDLIFE LATELY?**

"What Have You Done for Wildlife Lately?" is the new theme of the Commission's Nongame Wildlife Education Program. This theme evolved as research revealed Floridians are strongly concerned for wildlife but slow to act on its behalf. By providing suggestions and examples of how citizens can support and preserve wildlife, Nongame Education seeks to transform awareness into action.

Pat Millsap is a nongame education specialist in the Commission's Lakeland Regional Office who develops education programs and conducts teacher workshops. In addition to the burrowing owl project, she is also working on a kestrel recovery and education program. 

FROM AWARENESS TO ACTION

By Mark Damian Duda

Floridians are deeply attached to wildlife. Public opinion polls indicate that most Floridians believe wildlife is important and that more should be done to preserve wild creatures and their habitats. But although a majority of Floridians express concern over the plight of wildlife and the natural environment, only a small percentage are acting on these concerns.

Floridians are slow to transform concern for wildlife into action for a number of reasons. Some feel their efforts are futile; others think one person can't make a difference; many are too busy. But Nongame Wildlife Program staff have found, through extensive research, that the major reason people don't act on behalf of wildlife is that they don't know what they *can* do to help.

Thus the Nongame Wildlife Program has put together a list of specific actions citizens can take to help conserve Florida's wildlife, including the following. For a more extensive list of suggestions, please write the Nongame Wildlife Program, Florida Game and Freshwater Fish Commission, 620 S. Meridian Street, Tallahassee, Florida 32399-1600.

Follow a Code of Ethics to Lessen Harmful Impacts of Bird and Wildlife Watching

Bird and wildlife watching, if done improperly or without consideration for the resource, can severely impact Florida's wildlife. Wildlife watchers sometimes trample important wildlife habitats and unintentionally harass animals to get a closer look. Be careful to consider how your recreational activities may harm wildlife and take steps to lessen adverse impact.

Report Wildlife Law Violations

If you know or even suspect that a wildlife law is being broken, report your concerns to the Commission's WILDLIFE ALERT regional toll-free numbers (listed on page 48).

For example, since burrowing owls are a protected species, destruction of the birds *or their nests* is a crime. Callers may remain anonymous, are not required to appear in court, and may even receive an award if their report leads to an arrest.

Take a Child Bird Watching, Wildlife Identifying, Bug Collecting, Fishing or Hunting

Childhood events greatly influence adult attitudes toward wildlife and the natural world. Nothing seems to foster positive attitudes toward wildlife more solidly than direct participation in wildlife related activities.

Get Involved With the Local Comprehensive Planning Act

Did you notice how the Cape Coral efforts to save the burrowing owl had attracted the attention of the City Planners Office? With citizen input, communities can incorporate measures for wildlife protection directly into their growth management plans.

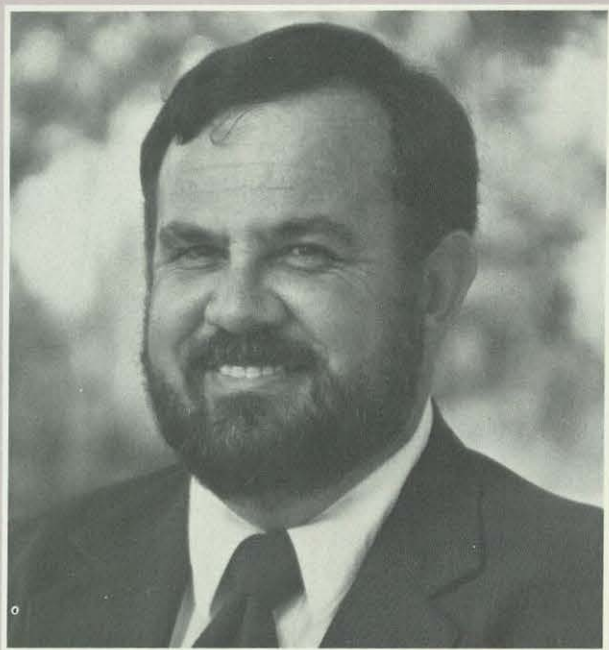
Landscape Using Native Vegetation

Landscape planning is important even in your own backyard! Plant native vegetation around your home to attract wildlife. Learn how by reading "Planting a Refuge for Wildlife," also available free from the Commission's Nongame Program. ①

Mark Damian Duda is the nongame wildlife program's planning and evaluation coordinator.

Conservation Update

Compiled by Andrea H. Blount



Frank Montalbano

Director of Wildlife Honored

Frank Montalbano III, director of the Commission's Division of Wildlife, was honored recently by the Wildlife Society. Montalbano was named the recipient of the Jim McDonough Award for his contributions to the wildlife profession.

This national award recognizes Montalbano's numerous conservation achievements, particularly in the development of Florida's waterfowl management programs. He is credited with formulating state and regional field studies documenting the importance of freshwater marsh systems to wildlife, especially waterfowl.

Montalbano's 14 years of service to the Florida Chapter of the Wildlife Society was recognized in the nomination letter. The letter stated: "His numerous field studies have helped foster greater respect for these unique systems [freshwater marshes] and his dogged persistence on management and conservation issues has helped to elevate concerns over the loss of the functions of these valuable systems."

Montalbano has been with the Florida Game and Fresh Water Fish Commission for 14 years and has been director of the Division of Wildlife for three years.

The Wildlife Society will present the award at the 54th North American Wildlife and Natural Resources Conference in Washington, D.C. in March.

Girl Scouts Receive Youth Conservation Award

The Florida Wildlife Federation, a private conservation association, recently awarded the 1988 Youth Conservationist Award to the Girl Scouts of Florida.

Over 40,000 Scouts participated in the statewide "Florida Wetlands Project" educational service projects. The state wetlands program was designed as a permanent, continuing service project through which Girl Scouts can earn conservation badges.

Florida National Scenic Trail

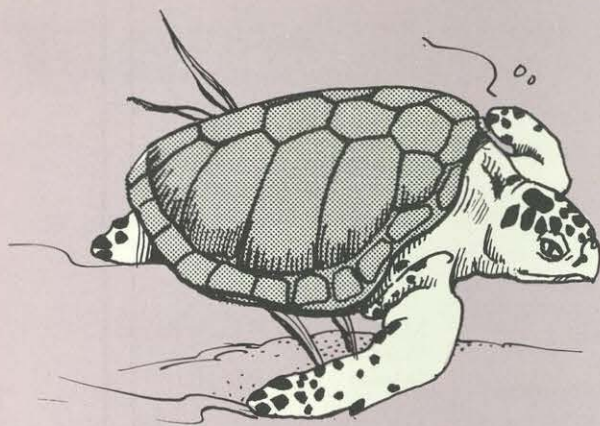
The first section of the Florida National Scenic Trails System recently became a reality with the official dedication ceremony in the Apalachicola National Forest.

Representatives from the U.S. Forest Service, U.S. Fish and Wildlife Service and the Florida Department of Natural Resources met to certify 109.4 miles of trail. Now designated as part of the National Scenic Trail are 41.7 miles of the St. Marks National Refuge, a portion of the St. Marks to Tallahassee Historic Rail-Trail (1.7 miles) and 66 miles of the Apalachicola National Forest.

"Plant a Tree for Life"

Slash pine seedlings were recently made available to Florida fifth graders through the cooperative efforts of the Florida Department of Education and the Florida Department of Agriculture and Consumer Services.

The "Plant a Tree for Life" educational program was established to explain the role of trees in the environment, energy and soil conservation, the aesthetics of urban surroundings and the role trees play in producing oxygen. Teachers were presented with lessons and educational materials dealing with global deforestation and the greenhouse effect during the February "Florida Plants a Tree for Life Week."



Loggerhead Turtles Blinded By the Light

Researchers trying to stabilize declining loggerhead turtle populations may have discovered an economical way that beachfront property owners can keep security lighting without confusing hatchlings as they try to find the ocean.

Whereas loggerhead hatchlings are usually attracted to conventional lights, they appear to have an aversion to low-pressure sodium lights, which shine pure yellow. Thus it is possible that if these lights were used on beaches, hatchlings would actually crawl away from them toward the water. This efficient light source uses a 150-watt bulb and offers the same amount of illumination as do conventional mercury vapor street lights, which use 400-watt bulbs.

Scientists at the University of Florida's Center for Sea Turtle Research were unsuccessful in trying to discover a light source that loggerheads couldn't see. They next studied commercially available light sources and found a negative reaction to the monochromatic yellow light. This discovery came after many hours of testing with various light sources, including white, red-tinted and yellow-tinted bug lights.

On an undeveloped beach, loggerhead turtles hatch at night and immediately head into the ocean—the area with the greatest illumination. "Even the slightest amount of natural light from the stars and moon will be reflected off the water," said Karen Bjorndal, director of the Center.

Yet as beachfronts are developed and security lights added along the shorelines, loggerhead hatchlings are frequently attracted by brightly illuminated areas. This attraction usually leads to fatal interactions with automobiles or predators.

Although some beachfront communities turn off their lights during the May through August nesting season, most hesitate to do so because of security reasons. Researchers hope that sodium lights will provide a solution to this dilemma.

Scientists believe that loggerhead turtles have been nesting on southeastern beaches for 200 million years. Now, because of mankind, they are a threatened species

whose numbers have declined to approximately 25,000. Florida's loggerhead population is proportionately smaller, primarily because of beach development.

Though sodium lights resolve one of the conflicts between beachfront development and nesting turtles, researchers fear that the loggerheads may have such an aversion to the yellow sodium lights that female turtles will not come ashore to nest. Center personnel hope to continue the research next summer with funding from the Florida Power and Light Company.

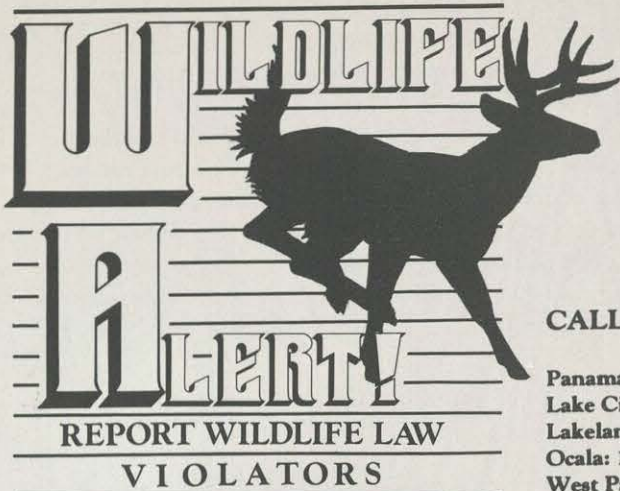
Earth Day 1990

U.S. environmental groups representing more than seven million members have united to launch an international Earth Day in April, 1990. Leaders of the nation's largest environmental organizations are planning cooperative efforts with business, labor, students, farmers, urban groups and others. Environmentalists are also making efforts to contact students in grade schools, high school and college campuses in order to reach a new generation of voters.

More than twenty million Americans participated in the original Earth Day in 1970, which was limited to activities in the U.S. Because major environmental issues are international in scope, next year's event will address worldwide issues of global warming, destruction of the ozone layer, acid rain, plutonium proliferation and ocean pollution.

"We hope that Earth Day 1990 will rekindle the spirit that launched the original Earth Day, and will spur people everywhere to work even harder to build a sustainable society," said Jay D. Hair, president of the National Wildlife Federation. ①





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Floridana

Turtles are quiet animals. They are part of a woodland environment that often appears to be tranquil. But if a hunter suddenly snaps a twig or a fisherman drops an oar, these otherwise slow-moving reptiles quickly retreat for safety. Turtles have the fast responses of a prey species, though few Florida sportsmen hunt these animals and several are legally protected in our state.

Prehistoric Floridians held a different view, however. Some 12,000 years ago, Paleo-Indians living on the Florida peninsula, then much broader, relied heavily on turtles as a regular and readily available food source. One large turtle, now extinct, was a member of the genus *Geochelone* in the tortoise family, Testudinidae.

Although it is hard to piece together the exact habitat for this turtle, similar species that exist today—including the giant Galapagos tortoise—suggest that it inhabited subtropical and tropical regions of grassland, savanna, and some tropical forest, an environment consistent with that of the Florida Paleo-Indian.

The Florida species of *Geochelone* became extinct about 10,000 years ago, and many archaeologists contend that the Indians' intensive hunting was the cause. The ease with which they could capture and kill these giant reptiles was probably the fatal factor in their disappearance. As a final blow, these turtles could not endure environmental change occurring at the end of the Pleistocene: Florida grew cold.

Non-burrowing turtles, like *Geochelone*, simply could not withstand the increasingly severe winters.

Today, archaeologists excavating sites of early Indian settlements throughout Florida frequently find turtle remains among assemblages of artifacts. In Hillsborough County, they discovered a *Geochelone* bone fragment that appears to have been cut by Indians in the butchering process. Another Florida site, Little Salt Springs, revealed a direct association between humans and turtles when archaeologists found a 12,000 year old wooden stake, intact, in the shell of a large turtle. Evidence of this sort has helped Florida archaeologists substantiate the hunter/prey relationship between Paleo-Indians and turtles.

— Phillip M. Pollock

